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The following abbreviations are used in this volume:

ACABQ	— Advisory Committee on Administrative and Budgetary Questions
ACAST	— Advisory Committee on the Application of Science and Technology to Development
ACC	— Administrative Committee on Co-ordination
CIOMS	— Council for International Organizations of Medical Sciences
DANIDA	— Danish International Development Agency
ECA	— Economic Commission for Africa
ECAFE	— Economic Commission for Asia and the Far East
ECE	— Economic Commission for Europe
ECLA	— Economic Commission for Latin America
FAO	— Food and Agriculture Organization of the United Nations
IAEA	— International Atomic Energy Agency
IARC	— International Agency for Research on Cancer
IBRD	— International Bank for Reconstruction and Development
ICAO	— International Civil Aviation Organization
ILO	— International Labour Organisation (Office)
IMCO	— Inter-Governmental Maritime Consultative Organization
ITU	— International Telecommunication Union
OAU	— Organization of African Unity
PAHO	— Pan American Health Organization
PASB	— Pan American Sanitary Bureau
SIDA	— Swedish International Development Authority
UNCTAD	— United Nations Conference on Trade and Development
UNDP	— United Nations Development Programme
UNESCO	— United Nations Educational, Scientific and Cultural Organization
UNESOB	— United Nations Economic and Social Office in Beirut
UNFPA	— United Nations Fund for Population Activities
UNICEF	— United Nations Children's Fund
UNITAR	— United Nations Institute for Training and Research
UNIDO	— United Nations Industrial Development Organization
UNRWA	— United Nations Relief and Works Agency for Palestine Refugees in the Near East
UNSCEAR	— United Nations Scientific Committee on the Effects of Atomic Radiation
USAID	— United States Agency for International Development
WHO	— World Health Organization
WMO	— World Meteorological Organization

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INTRODUCTION

NEW developments and profound changes of outlook in matters affecting health, disease, the health services and the aspirations of people and communities have taken place with a rapidity that none of the founders of WHO or those present when it took its first steps 25 years ago could possibly have foreseen. During the Organization's short life there has been a gradual and sometimes radical transformation in both thought and technology, which has brought about a number of fundamentally new approaches to the tasks facing the Organization and its Member States.

It is appropriate, in this twenty-fifth anniversary year, to pause for a moment and look back along the path we have travelled so far, to consider where we stand today, and to ask ourselves what direction we should take during the next 25 years in order to draw closer to WHO's abiding objective of the attainment by all peoples of the highest possible level of health.

The Organization has, partly consciously and partly unconsciously, been asking three questions.

First, can we comprehend the nature of health and disease? Can we describe the processes involved so that we can understand their causes and know that we are not merely at the mercy of unaccountable chance? We can answer this question with some real pride in achievement. Many disease processes are now sketched out in such a way that we can begin to understand them; and, although there are large gaps to be filled in our knowledge of, for instance, cardiovascular diseases, cancer and the mental illnesses, we do not doubt that their etiology and incidence will eventually be clarified by methods of investigation and thinking similar to those that have shed light in other areas.

Secondly, can we develop adequate and effective tools with which to interrupt or prevent these disease processes? Again, the record of success is remarkable. For many a disease, not only can we show why it occurs, but we can demonstrate that it can be prevented or influenced.

Thirdly, can we show that these tools can be applied to the appropriate populations in a manner at once effective, economic and acceptable? This question we can answer only partially. On the one hand there are the real successes. Mortality has decreased in many countries, and the developed world has rapidly moved away from the killing communicable diseases of childhood to a different pattern made up more of a series of individual threats than of community catastrophes. Medicine and the health services can properly take some credit for these changes, although it is unlikely that we shall ever be able to calculate how much has been due to the social and economic changes, and the consequent physical improvements, which have occurred simultaneously. The world programmes against malaria and small-pox, which have taken place independently of social changes, are more clearly to medicine's credit. There have been mistakes, difficulties and failures here too, but the results, visible and impressive, may point to similar opportunities. But what must we set against these successes? Why can we mention only a few diseases? Why have we to state that many of these changes are occurring in some countries only?

Why must it be said that a large part of the population of the world has no access at all to health services and that, in these countries, the services that do exist are often underutilized or ignored?

Four factors are commonly advanced in explanation: lack of resources, lack of technical manpower, lack of health education, and lack of planning and management. I am certain that all these explanations have real validity. However, it is understandable that I may have some doubts as to the reasoning that attributes such dominance to them.

In many countries of the third world the proportion of the resources in the national budget allotted to health is not very dissimilar to that in the developed world. To it must be added the sums spent by individuals or families directly upon their own health care; and these, we suspect, may often represent a substantial part of their disposable incomes. The total might still be small in real terms if it were used to buy a health service of the type that is to be found in the developed world. But it is by no means clear that this is what these populations want—or, indeed, that it is what they need in order to reduce their health problems. There appear to be few examples which we can use to compare their wishes and needs with the resources that could be made available. Possibly the gap is not as wide as we have imagined.

It is impossible to conceive of a health service without trained manpower. And yet, it has been said that some countries train persons to leave their countries. The development of health manpower entails a series of actions taken to fulfil specific health service needs; it is not something that can just happen independently of those needs. It is unlikely, moreover, that the provision of sufficient manpower will, by itself, make a malfunctioning health service function better. Despite protestations to the contrary, it does appear that much of the developing world has had imposed upon it a manpower pattern that is foreign to it and that is unlikely to function properly in the conditions obtaining there.

While we also accept that people should be informed and that education in health is essential, we must also be cautious in the assumptions we make. It is not just for lack of knowledge that man continues to court the risks associated with smoking, obesity, sexual promiscuity, lack of exercise, or stress. It may be fallacious to assume that human behaviour will change radically as a result of education in respect of, for instance, over-frequent pregnancies and dietary imbalance, or the importance of immunization.

Experience of the past, knowledge of the present, our few certainties and many doubts combine to suggest that we should reassess not only our priorities but also our future strategies. True, we must build upon past successes and continue to fill the gaps in our knowledge of diseases and to perfect the tools to use against them. Parallel with this, however, we should perhaps turn more directly to the consumer and the small communities—the smallest units; not so much so that we can find out how to attain further health goals, but rather to clarify basic issues on which to ground future rules for health service development. We must have the courage and the skill to go to the consumer and put questions to him as to his needs and problems and we must find out what are the conditions or factors that determine the possible solutions. One of these is certain to be cost; but others, which may be related to human dignity, disruption of the existing patterns of society, and authority, are only faintly suspected. If we know the problems, I have little doubt that solutions can be found. From them a primary national health service module can be made and a workable, manageable, and acceptable series of national health services can evolve.

There is no doubt that health services should be national and based primarily upon national resources. However, the building of a national service will frequently require the help of outside resources before it

acquires the strength and the expertise needed to continue to develop by itself. WHO has the mandate, the structure, and the necessary relationship with countries to play a crucial role in this process. To do so it will need to clarify the issues further, to build more strongly upon its relationship with research scientists and with the consumer, and to participate to an even greater degree in long-term intensive efforts within countries whenever a likely opportunity occurs. There are difficulties related to the manner of approach as much as to differences in priorities. They can be highlighted by our past successes and failures. The solutions will be made easier by a proper appreciation of the achievements which follow.

*

Many of the threats due to communicable diseases continue to decline. The best example is the dramatic reduction of smallpox throughout the world, to the point where we can think in terms of its complete eradication within the space of the next few years. Since 1967, when the Organization started its intensified eradication campaign, the estimated annual incidence of smallpox has fallen from 2.5 million to less than 200 000. The number of countries reporting smallpox decreased from 91 in 1945 to 42 in 1967 and 19 in 1972. By the end of 1972 smallpox was believed to be endemic in only 7 countries, 23 fewer than in 1967.

In this world campaign, systematic vaccination and surveillance have proved so effective that there is no reason why smallpox should not disappear for ever once transmission is interrupted. The campaign has produced tangible results of a kind to impress cost-conscious authorities. Because of the great decline in the disease, it has become possible for the United Kingdom and the USA to reduce their vaccination programmes drastically, so much so that the USA alone has been able to make a yearly saving nearly equivalent to WHO's annual budget. This is a direct consequence of the world campaign against smallpox, and, indeed, there is no better illustration of the substantial economic advantages that international cooperation in health can bring.

The remarkable success of this attack should make us ask whether there are other diseases which can be dealt with in a similar way. The answer is not clear.

Many more difficulties have been encountered with malaria, the other disease that the World Health Assembly has considered amenable to eradication. In embarking on the worldwide malaria eradication campaign in 1956, WHO predicated the possibility of interrupting malaria transmission by the use of residual insecticides, and it has had a remarkable degree of success. In 1945 it was calculated that at least 1800 million people lived in malarious regions. In the past 15 years 721 million people living in previously malarious areas have been freed from threat of the disease, and another 631 million are now protected either by spraying and surveillance operations or by drugs regularly administered. Of the 480 million people living in areas where eradication programmes are not yet in operation, 210 million are benefiting from limited malaria control measures. Because of the organizational, financial, logistic and technical problems involved, the progress of malaria eradication has not been spectacular in all countries. However, even in the areas where programmes have advanced more slowly than expected, malaria morbidity and mortality rates have been very significantly reduced.

Attention must now be focused on the nearly 270 million people living in malarious areas, mostly in Africa south of the Sahara, who receive no organized protection against this disease. The combination in these areas at present of inadequate funds and trained manpower and complex ecological conditions favouring the maintenance of malaria transmission makes malaria eradication within a short time

impracticable. To reduce the inroads caused by a disease that is seriously hampering economic and social development, governments must exert every effort, with the technical support of WHO and the cooperation of the wealthier countries, to organize malaria control activities within the framework of the general health services. For the global malaria programme, two aspects are of the utmost importance: the training of malariologists with a broad background in tropical and environmental health, including the epidemiology and control of insect-borne diseases; and research to develop suitable methods of controlling malaria where eradication within a given time is not at present feasible.

The reasons behind our inability fully to consolidate the enormous gains made are multiple. Some are related to the nature of the disease itself and the methods we have for interrupting its transmission. Others may be related to our misplaced expectation that any such endeavour can be successful without a health service organization which provides preventive and curative care to all segments of the population and therefore has both the confidence of the community and the coverage necessary for malaria control.

Tuberculosis is one of the diseases that is understood and against which we possess simple and effective tools. Yet today it still ranks second among the priority health problems in four of the six regions of WHO. In the Western Pacific Region as a whole, it is actually the health problem of greatest priority. This may be because, except in a few countries, BCG vaccination has not been applied with the required intensity.

There is enough evidence to show that, if only a high BCG immunization rate could be achieved and maintained for long enough in the susceptible population, this disease, too, could be expected to decline to relative insignificance. Nevertheless, because of the long interval between infection and the appearance of clinical manifestations, to achieve this degree of success would take time—not the few years needed for the acute infectious diseases but at least a generation. It will also require a greater awareness by the medical profession of the value of BCG vaccination. But even given this awareness, such is the pool of already infected persons that the continued immunization of susceptible persons would be needed, and this means a continuing organizational structure rather than a campaign. This structure is also necessary for treatment, which has undergone a revolutionary transformation. Systematic research, particularly the controlled clinical trials which WHO was instrumental in initiating, has had far-reaching consequences. It has been found that institutional treatment, with its disruption of family and social life, has no advantage over ambulatory treatment and can be dispensed with. The demonstration that infectiousness is lost soon after chemotherapy begins, and the fact that there is effective chemotherapy, mean that patients need not be taken from their home setting and, indeed, can continue to work. It is a tremendous stride forward to be able to say that in most cases there is no reason why tuberculosis should not be treated outside the hospital.

The epidemiological and socioeconomic requirements of a realistic tuberculosis programme can be satisfied only if a wide network of services with a great number of diagnostic and treatment centres is permanently available for patients whenever and wherever they seek help. Only the general health services can provide this network. During the past two decades, WHO has made great efforts to promote research to define a standard technology for the early detection and treatment of infectious tuberculosis patients. Simplification and standardization of all the activities previously carried out exclusively by the specialist have meant that they can now be safely handed over to the non-specialist physician, and even to non-medical health personnel.

*

There is a large group of communicable diseases which persist because we lack the technical means to deal with them adequately. Plague, for example, has natural foci outside man that we cannot eliminate, so there is always a danger that it may spill over into the human population. Influenza, a truly international disease, affects millions of people every year. We are unable to prevent its spread, but individuals can be protected by vaccination, and in the developed countries vaccine is usually available for high-risk groups. However, when new strains of virus appear, vaccines prepared from previous strains may not be effective.

Yellow fever is in a different category. It has almost disappeared in cities in the Americas, where it is now virtually an occupational disease of those penetrating jungle areas. In Africa, because of the different ecological situation, the possibility of large outbreaks remains. Fortunately, yellow fever vaccine is highly effective, and the immunity it gives may prove more durable than the 10 years attributed to it at present.

Wildlife rabies is another disease for which we lack the knowledge to prevent danger to the human population. This disease is now spreading across Europe into countries long free of it, carried by its main animal vector, the red fox. Strenuous efforts to reduce the numbers of foxes in border areas sufficiently to stop the disease from crossing national frontiers have failed.

The infectious diseases of childhood (diphtheria, whooping cough, tetanus, poliomyelitis, measles) are good examples of diseases for which we have the tools but not the answers we need to apply them effectively even in situations where a health-care delivery system exists. Research is urgently needed to answer a whole range of questions. How many different vaccines can be given at one time? What is the longest feasible interval between vaccinations? How can the stability of vaccines be improved to make them easier to handle in remote areas? What is the most efficient way of getting vaccines to the people at the right time? Could vaccines be made available more cheaply? What is the simplest form in which they can be given so that a mother or a family or village worker could use them? There are good reasons to believe that these questions can be answered and that the lessons can be widely applied.

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There is no doubt that national administrations and WHO could react more effectively and economically if a surveillance system was available for a wide group of diseases.

Man is travelling more often and further afield as quicker and cheaper travel brings distant countries within reach. The volume of international traffic is such that the risk of importation of exotic diseases is steadily increasing. Some diseases picked up abroad, such as malaria, are dangerous only to the infected person if he returns to a non-receptive area, but others such as smallpox and cholera, are a hazard to the community to which he returns.

WHO has developed sophisticated systems for relaying notifications of disease, but any system, however advanced, is only as good as the information fed into it. We suffer from the chronic problem of undernotification. The information available at the international level is incomplete. This problem may be only partially solvable and the cost and the difficulty of having a really efficient system may need to be set against the needs—problem by problem and disease by disease.

*

The outlook and stage of development with the noncommunicable diseases are quite different. Mental disorders are a good example.

Some 10% of any population will suffer from severe mental disorder at some point in their lives, and at least 1% are affected at a given time. What is more, there seems little doubt that the frequency of such mental diseases as psychogeriatric disorders will increase. The paucity of resources, particularly of human resources, to look after the huge numbers of people affected has meant that new methods of care for the mentally ill are being sought and tried out—for example, the treatment of chronic patients within the community. A variety of new approaches is being used in social psychiatry: community-centred services, day hospitals, hostels, sheltered workshops, the boarding out of chronic patients to families.

There are gaps in our knowledge of this group of disorders, affecting both a clear definition of the conditions and our understanding of their etiology. Despite this, the tools we have available are rapidly increasing. Since the Second World War, no development in psychiatry has been more important than the advent of psychotropic drugs, which has been closely followed by a change of orientation in psychiatry to a more social approach. Chemotherapy has made it possible not only to treat whole groups of patients formerly condemned to a lifetime in institutions but also to remove many of the predominant symptoms, sometimes dramatically improving the patient's health. The major consequence of this advance—and I think we are justified in terming it a breakthrough—is that the traditionally lengthy hospitalization of the mental patient has become unnecessary in most instances. Today the vast majority of psychiatric cases can be treated as outpatients. Indeed, we are faced with the fact that the care of the mentally ill, up to now provided predominantly by psychiatrists, is increasingly becoming the responsibility of the general health services, to the extent that in one large European country 19 of every 20 mental patients are treated by general practitioners. The consequent fall in the demand for psychiatric beds does not mean that the resources devoted to the mentally ill can be reduced—indeed, a shortage seems to exist in almost all countries—but simply that they are applied at different points.

Psychiatrists will undoubtedly have to assume new roles, often functioning as consultants to the general health services. Addressing their skills to some of the problems that preoccupy us today, they may be able to contribute to our understanding of the psychosocial aspects of the environment—of urbanization, changing social structures, crowding, and the increased pace and stress of life.

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Two very different major public health problems, cancer and hypertension, may be considered together, for in the present state of our knowledge both are diseases requiring early detection if they are to be treated effectively. Unfortunately early diagnosis, though universally recognized as important, is not yet sufficiently widely practised.

Our concept of cancer has undergone substantial changes since the foundation of the Organization. Only a few physical agents and chemical substances were then known to produce cancer; now, through research on animals, in some cases confirmed by epidemiological studies, many groups of chemicals have been identified as definitely carcinogenic, and knowledge of the viral etiology of some forms of cancer has greatly expanded. This is a field in which the Organization has always been active, and the work is now being pressed forward by the International Agency for Research on Cancer.

It is impossible to state with precision what proportion of cancer cases could be prevented by eliminating carcinogens from the environment, although the figure is suspected to be high. We know that practically all cases of occupational cancer could be prevented if proper measures were taken to prevent workers from coming into contact with carcinogenic substances. There is great scope for public health authorities to take immediate and positive action in ridding our surroundings of carcinogens.

Another important step forward has been the systematic scientific application of epidemiology to cancer in order to investigate possible relationships between specific etiological factors and the disease. One of the most widely publicized of these studies has demonstrated convincingly that the incidence of bronchial cancer is strongly correlated with cigarette smoking. The evidence shows that a reduction in this harmful habit could significantly reduce lung cancer—a conclusion of special importance because at the moment the results of treatment of this type of cancer are still far from satisfactory.

The immediate task for health authorities, in addition to preventing environmental hazards, is to strengthen facilities for early diagnosis so that cancer sufferers can be treated at the earliest possible stage, when the chances of success are best. Important as it was 25 years ago, early detection is vital today because treatment is much more effective than it used to be; not only have traditional methods of radiotherapy and surgery been improved, but chemotherapy has also come to play a major part as new drugs have proved their worth. Not enough people have paid heed to what a WHO expert committee said about treatment in 1965: "This hopeful aspect of cancer is insufficiently appreciated, even by the medical profession itself; too many pessimistic patients find themselves consulting equally pessimistic physicians". However, the challenge posed by early detection as a public health measure will not be easily overcome, for mass screening of whole populations would be a tremendously complex and costly operation. This explains the careful attention now being given to the more practicable alternative of selective screening of high-risk groups. The study of this important field has become a major part of the cancer control programme being carried out by WHO.

Arterial hypertension is the commonest circulatory disorder throughout the world, affecting about 10% of adults, both men and women. The condition is infrequent only in some very primitive tribes and in populations living at high altitudes. By far the greatest proportion of subjects are those who suffer from essential hypertension, followed by renal parenchymal and renal vascular disease.

It was not until the early 1950s that modern synthetic drugs capable of lowering high blood pressure started to appear, and they have entirely changed the prognosis for hypertension. Patients with malignant hypertension can now be maintained in good health for years. Through continued treatment with hypotensive drugs, the serious complications of hypertension—stroke, hypertensive heart failure and hypertensive renal diseases—can be largely avoided. We do not yet know, however, to what extent such treatment reduces the incidence of ischaemic heart disease, of which hypertension is one of the main predisposing factors. Unfortunately, the highly effective treatment we now possess is given to only a fraction of hypertensive subjects, as many have no symptoms prompting them to see a physician or, if they start drug treatment, do not continue it for the long period needed. The excellent chance of reducing the serious complications of hypertension and the present failure to apply therapy to those who need it call for measures to detect and treat all hypertensive subjects at the earliest possible stage of the disease. WHO has initiated pilot control programmes covering a total of some 750 000 people in 15 communities in various parts of the world. It is hoped that within a few years these programmes will give an idea of how best to detect and control hypertension in entire populations, so as to prolong the active life of

countless people with high blood pressure. The general public needs to be kept fully informed of all developments, for its active participation is essential for success.

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We may now turn to two apparently disparate groups of disorders which both reflect social trends to a substantial degree, for they are dependent on human behaviour—the venereal diseases, and drug dependence and alcoholism. The failure to control venereal diseases is arousing worldwide concern. The introduction of antibiotics and advances in diagnostic techniques at first aroused great hopes, and 25 years ago some workers were optimistic in their belief that the diseases could be rapidly suppressed. Up to 1958 this hope persisted, but soon the prevalence soared to the levels recorded in the great social upheavals arising from the War. Today, despite the fact that the treatment is effective and the diagnosis reliable, the world is in the grip of a virtual epidemic.

The seriousness of the situation is not in doubt. National health authorities are officially recording rates of 300-500 cases of gonorrhoea per 100 000 inhabitants, although they acknowledge that these figures constitute only a fraction of the total numbers. In almost all countries the annual increase in prevalence is as high as 8-10%, and it is principally young people aged from 15 to 25 years who are affected.

The situation for syphilis is perhaps a little less alarming. Nevertheless, in countries where endemic treponematoses have been greatly reduced by mass campaigns, it is feared that new generations no longer immunized by these endemic infections will become receptive to syphilis. In some areas this is already happening.

How are we to explain the paradox of the spread of these diseases, which we have not succeeded in checking even though treatment is relatively simple? One reason is that they are highly contagious. Another is that their spread depends on the way individuals behave. All the social, psychological and economic factors that encourage promiscuity help at the same time to spread venereal disease. Perhaps the main reason is the inadequate health education of the public. This is coupled with the fact that medical and other health personnel often lack familiarity with the venereal diseases or underestimate their importance. The result is that preventive action is less than it should be; the diagnosis is delayed and treatment is confined to the patient and does not reach the contact. So transmission continues and will continue so long as shame renders those suffering from venereal diseases reluctant to seek medical advice.

When human behaviour has a role in the etiology of a disease it may sometimes be logical and desirable to attempt to modify it, but this calls for serious reflection—and a long uphill struggle. Specific prevention by vaccination is still a hope for the distant future. What action can be taken now to contain the epidemic?

For the immediate present, a number of measures are within the reach of most health services. They must assess the problem through case-finding, contact-tracing and notification. Physicians and other health workers must play an effective part in diagnosis, treatment and prevention in cooperation with existing specialized services. Epidemiological research could then come into its own.

In contemporary society, in spite of the emphasis on sex, sex education and health education are deplorably inadequate. This is recognized by everybody but far too little is done about it, and it is

undoubtedly one of the major causes of the present situation. Quick action is essential before sexually transmitted diseases become completely out of control.

Drug dependence and alcoholism share with the venereal diseases two distinctive features: they are closely linked to "seeking" behaviour, and the situation has worsened markedly over the past quarter of a century. The use of psychoactive substances for recreational, medical, and other purposes probably goes back to prehistoric times. But the use of dependence-producing drugs on the present scale and the concern about the harm they may cause are something new. Twenty-five years ago the use of psychoactive drugs other than alcohol, in Western cultures at least, was chiefly a problem of minority groups and slums. But now drugs have invaded society at large, and their ill effects, like those of alcohol, cut across all socioeconomic classes. The reasons for this spread have aroused much speculation. One factor is surely the revolution in transport and communications, which enables new ideas as well as goods to travel round the world at unprecedented speed.

The non-medical use of drugs is not an easy subject to tackle. It is hedged about with emotion, for one thing, because it concerns groups and concepts that most societies take very seriously: youth, morals, religion, the law. It involves profit-making, not only by illicit traders, but also by legitimate manufacturers and, particularly in the case of alcohol, by governments. What is more, drugs are disseminated by perhaps the cleverest of vectors, man. We need more epidemiological studies to show us who is involved, how, why, and what the consequences may be. It is quite clear that drug-users cannot be regarded as uniform populations. The more than 20 million people in the USA estimated to have tried cannabis range from those who give it up after using it two or three times to the small minority who become dependent on it, with a full spectrum of modes of use in between. People take drugs for different reasons and in different ways.

Whether we like it or not, the problems associated with the non-medical use of dependence-producing drugs are likely to remain with us. Our aim in the immediate future must be to keep the damage to individuals and to society to a minimum. But first and foremost, at a time when punitive attitudes toward drug-users are not uncommon, we must be on our guard lest the control measures we impose inflict more harm than the disorders they are designed to prevent and control.

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The picture is no less gloomy for two quite distinct groups of diseases that may be regarded as socioeconomic, in that they are closely linked with standards of living and will continue to be rife so long as doctors, economists and planners do not work together. These are the diseases perpetuated by malnutrition and by poor sanitation.

There has been a constant fear over the past 25 years that world food production could not keep pace with the tremendous increase in the world's population. In the absence of reasonably accurate figures this fear was understandable, and it is impossible to say what the position will be in the future. At present, however, according to the latest FAO figures, the critical point is not necessarily the supply of food itself. FAO's Agricultural Commodity Projections for 1970-1980 show that at both world and per capita level there is no protein gap. At per capita level the protein supplies available for human consumption exceed today's needs by 70%.

It is paradoxical that so many children are affected by protein-calorie malnutrition in a world that apparently produces more than enough protein for each of its inhabitants. There need be no shortage,

and yet the gap is very real for the most vulnerable and deprived groups, especially the young in the developing countries. The crucial problem is the unequal distribution of food supplies—unequal between developed and developing regions, unequal among socioeconomic groups, unequal even within households. Some countries export large quantities of food products while their own populations remain undernourished. Production of all kinds of food must be increased, particularly in developing countries, but the most urgent need is for a fresh look at the problem of distribution.

The formidable task of providing everyone with safe drinking-water and improving the disposal of liquid and solid wastes is a matter to which I have drawn attention many times in past years. There is a close relationship between the incidence of diseases of poor sanitation and the stage of economic and social development, although sporadic outbreaks in the more advanced countries forcibly remind us that constant vigilance is necessary and that islands of inadequate sanitation persist all over the world. Among the diseases of poor sanitation are cholera, bacterial dysentery, typhoid fever, amoebiasis, E. coli infection and infectious hepatitis. If bad dwelling conditions are added, we may include cerebrospinal meningitis and the streptococcal infections, in which overcrowding and bacterial air pollution play a very important part.

Some of these diseases receive little prominence, and yet they sap the strength of the populations in the majority of Member States of WHO. A survey by the Organization has shown that diarrhoeal diseases are a major health problem in all the world's developing regions. In a field where what statistics we have are notoriously unreliable, we none the less know that enteric diseases taken together affect about a third of the human race, account for large numbers of deaths every year, and are one of the principal causes of morbidity in the world. The main victims, I need hardly add, are children.

On the technical front, the past 25 years have seen encouraging advances, as in the improvement of typhoid vaccine and the development of a new live Shigella vaccine. But the ultimate answer—and here progress has been disappointingly slow—remains better sanitation. Gigantic resources must be invested, and achievement is unlikely to exceed the pace of economic and social development as a whole.

The solution to the problem of the socioeconomic diseases does not lie with the medical profession alone; it can only be found through close cooperation between the health worker and the economist. It needs, especially, a political will to act. Adequate nutrition and sanitation have earned recognition as inalienable human rights, so that we are fully justified in regarding them as ends in themselves. And yet too many people have still to realize that investment in nutrition, clean water and other fields affecting health is not prompted merely by humanitarian aims but is essential for economic growth. In the years that lie ahead the health professions will have to make it their business to convince the political authorities that a healthy population is one of the most valuable capital assets a country can have and that, if a nation devotes the necessary funds to public health, its investment will always be productive. Countries cannot afford the burden that diseases due to malnutrition and poor sanitation impose on their development.

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Concern with the quality of the environment that man, through his ignorance, negligence and misuse, is now creating for himself was crystallized during the year by the United Nations Conference on the Human Environment, held in Stockholm in June. The conference's Action Plan for the Human Environment was noted with satisfaction in December by the United Nations General Assembly. In establishing a Governing Council for Environmental Programmes, a small environment secretariat, and

a voluntary Environment Fund, the General Assembly emphasized that problems of the human environment constitute a new and important area for international cooperation—an area whose complexity and difficulty require new approaches.

Of the 109 recommendations in the plan of action, 22 directly concern WHO and 21 others are of interest to it. This comes as no surprise, since the quality of the environment has always been a subject of prime importance to the Organization; environmental sanitation was included by the First World Health Assembly among the top priorities in WHO's programme of work. Over the years the scope of the environmental health programme has widened to include not only water supply and wastes disposal, but also housing and urban development, air, soil and water pollution, food hygiene, and the disposal of radioactive wastes. The proposals made at Stockholm are therefore not a new departure for WHO; indeed, the Twenty-fifth World Health Assembly had stressed the importance of many of them before the conference began. What the conference has done, however, is to focus world attention on the need for international action to arrest the deterioration of the human environment and to make it fit for this and future generations to live in. This is an international cooperative and collaborative endeavour that we warmly welcome, not least because it strengthens the attack on problems we have recognized and sought to solve for many years.

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A dominant theme of my introduction to the Annual Report for 1971 was the vital need for intensified research to obtain the knowledge essential for the control of diseases. It seems clear that the solution to the problem of cancer is likely to stem from research into its pathogenesis. One encouraging development has been the progress in the immunodiagnosis and immunotherapy of cancer, although the hopes raised by the most recent research have yet to be confirmed.

A host of questions remain to be answered before we can expect to conquer atherosclerosis and ischaemic heart disease. Priority should be given to research on their etiology and pathogenic mechanism. As atherosclerosis appears early in life, strategy in research should be oriented rather towards prevention of the onset and progression than to investigation of the fully developed disease. At the same time due attention should be given to early detection, care and rehabilitation of all subjects with ischaemic heart disease in the community. The results of preventive trials on subjects at risk of ischaemic heart disease should make it possible for large-scale programmes for screening, treatment and surveillance to be undertaken.

In leprosy, while reports from programmes for control through secondary prevention suggest that the incidence of secondary cases can be appreciably reduced, we still lack a specific vaccine and a diagnostic skin test.

Four important vector-borne parasitic diseases—schistosomiasis, filariasis, trypanosomiasis and onchocerciasis—affect hundreds of millions of people, although we have no accurate picture of their prevalence and severity and hence cannot estimate their true economic and social cost. Schistosomiasis is uncontrolled in most endemic areas and in some is spreading or increasing in importance. Our knowledge of the epidemiological and entomological aspects of onchocerciasis is growing, but the pathogenesis of its most important complication, ocular onchocerciasis, remains obscure. Filariasis is as yet uncontrolled in many areas. Moreover, there is evidence that the incidence of trypanosomiasis may be on the increase in parts of Africa, and for the American form, Chagas' disease, effective therapy is not

available. For these diseases intensive research is needed on vector ecology and control and on acceptable prophylactic and curative agents.

The complexity and interdependence of the factors involved in human development and public health are becoming increasingly clear, and have led many health administrations to give priority to the needs for optimum growth and development of at least the most vulnerable members of the family unit. In most of the developing countries this means interdisciplinary action on a wide front through maternal and child care, including family planning as a health measure.

The increasing number of requests from Member States for assistance in their provision of family planning care has in turn challenged WHO's overall research programme in two distinct but interrelated areas; one concerned with epidemiology, health behaviour and operational research relating to the delivery of family planning care, and the other bearing on the biomedical aspects of reproduction with stress on fertility-regulating agents, though also covering other aspects such as sterility, pregnancy, lactation and fetal growth.

One of the largest research programmes yet undertaken by WHO is the Expanded Programme of Research, Development and Research Training in Human Reproduction, one purpose of which is to develop a variety of safe, effective and acceptable methods of fertility regulation. Scientists from institutions in many countries are collaborating in this programme, which also includes biological and sociological research to improve understanding of the acceptability of fertility-regulating agents in different populations and cultures. Another aim of the overall programme concerned with human reproduction is to assist in developing and strengthening national institutions to carry out biomedical, epidemiological and operational research on subjects of national priority in this field.

Public health administrations are understandably concerned first and foremost with solving immediate problems. Yet we must not forget that the only path to progress is through more research. The areas in which a breakthrough could be made are beginning to be identified. We can thus direct our efforts into the channels that offer the greatest chance of success. This intensified research effort will demand the mobilization of all the available resources of institutions, universities, foundations, professional associations, and the pharmaceutical industry.

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Several groups of diseases thus have a major claim on the attention of the public health authorities, each in a different way. Discernible in them all, as indeed in the whole field of public health, is a constant theme—that while a nation must think, and plan, and act collectively for the public's health, most of the health problems we face in the world today require direct contact between the individual and the health services and therefore an individual decision. When this contact can be made between the right persons in the right situation at the right time, we can then apply to good purpose the tools that we do possess. In some instances the health services can identify the person, the situation and the time, but the contact cannot be made. This is due both to difficulties in organization and to the lack of confidence of the people in the health services. It is unlikely that this can be corrected unless we encourage the development of the health services as an expression of the wishes of individuals, families and communities in the villages and towns; they should visibly deal with the people's priorities, and not act as agents of outside forces, however benevolent. This will apply to problems as diverse as mass immunization, adequate surveillance, early detection or improved living conditions and sanitation.

A major advance along these lines is likely to be successful only if individuals, communities and governments, with the support of the international community, are determined to allocate a fair share of their resources to health. For its part, WHO will do everything in its power to assist Member States to quicken the pace of health service development. An idea of the scale and range of the efforts already being expended in this direction can be gained from a perusal of the list of projects elsewhere in this report. It would be fruitless at the present stage for developing nations to follow too closely in the footsteps of the most advanced countries. More profit can be derived from the resourceful use of existing means and a readiness to experiment imaginatively. To counter the extreme shortage and uneven distribution of physicians, for example, many countries are now using medical auxiliaries to bring primary health care to a larger proportion of the population. This idea could be developed further.

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I have briefly referred above to the development of health manpower, and I make no excuse for returning to this topic, at somewhat greater length, for it is one of the vital elements in any programme for the strengthening of health services. The shortage of health personnel will not be overcome simply by providing more and better training facilities without any reference to the structure of the health services in the countries concerned or to the needs that these services will have to meet. Nevertheless, in many countries training institutions for health workers continue to function more or less in a void, with ill-defined aims and little or no appreciation of the realities of the health situation. Not only must closer links be forged between national health administrations and the institutions that provide them with their staff, but special attention must also be paid to the broader issues of health manpower planning in the long-term projections for social and economic development. The strengthening of health services depends to a large extent on making the fullest possible use of both professional and auxiliary health personnel. It is now recognized that training should be job-oriented; in addition, the job should be adapted to the worker through improved organization and work design.

None of this is possible without detailed health manpower planning so as to match the supply of health personnel with the actual demand for services and with the capacity of the population to pay for such services, either directly or through the state. It is hoped that Member States will come to realize the advantages of more extensive planning of this kind.

The approach I have outlined calls for a number of innovations in the organization of national health administrations, in the training of health workers and in health manpower planning, including educational planning. While it is encouraging to note that some countries are adopting a system of health planning through manpower studies and surveillance, it is clear that the necessary changes in this field will require long and unremitting effort.

The Organization is now directing special attention to the analysis of the international migration of highly trained health personnel. We need to improve our understanding of the "brain drain" in terms of the causes and effects, the numbers involved, and the possible fluctuations in volume or destination. Only in this way will we be able to suggest measures that Member States may be willing to consider in order to intervene at the appropriate moment in the process.

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An important event in 1972 was the decision taken by the Twenty-fifth World Health Assembly to recognize the representatives of the Government of the People's Republic of China as the only legitimate representatives of China to the World Health Organization.

During the year, it is pleasing to report, Bangladesh, Fiji, Qatar and the United Arab Emirates joined the Organization as Members and Papua New Guinea as an Associate Member, with the result that WHO now has 135 Members and two Associate Members.

Any action taken by the World Health Assembly to extend the Organization's membership and bring it nearer to that universality which we all recognize as being essential to the success of WHO's work can, I believe, only be commended.

However, universality of membership is but an empty phrase if all Members are not active and do not strive in harmony and mutual understanding to attain their common objective. Here I would make a personal appeal in this, WHO's twenty-fifth anniversary year to the Byelorussian SSR and the Ukrainian SSR to respond to the hopes expressed by the Ninth and Tenth World Health Assemblies and resume active participation in the work of our Organization.

It has always been my contention, too, that it is paradoxical to speak of the desirability of universal membership and at the same time to make WHO's relations with or services to any of its Members contingent upon certain conditions being met or changes to be effected in their political and social systems. Let us not forget that, though the Organization works with and through governments, it does so in the service of the people of the countries concerned. We have no right to deny the assistance they need because Member States happen to be divided upon issues which are not directly related to the attainment of that single and inspired objective which they all recognized as being the one and only aim of the World Health Organization when they accepted its Constitution.

A handwritten signature in black ink, appearing to read 'T. G. Anderson', with a stylized, flowing script.

Director-General

PART I

GENERAL REVIEW

1. COMMUNICABLE DISEASES

1.1 At four-year intervals the Organization publishes reports on the world health situation that are based on information furnished by the governments of Member States in answer to a WHO questionnaire. The information provided includes an indication by the national health authorities themselves of the major health problems faced by each country. Each government's identification of a disease or group of diseases as a major problem is, of course, based on its own criteria for assessment. It may often reflect either a problem's intractability in a country or, contrarily, the availability of an effective weapon against it, rather than true prevalence or socioeconomic importance. The answers to the questionnaire are therefore not strictly comparable. Nevertheless, it is of some interest to set the problems most frequently singled out by governments for the quadrennium 1957-60¹ against those for 1965-68² (the latest period for which there is a comparable amount of information) to see what general trends emerge. A short list of the consistently recurring disease entities was prepared according to WHO Region modified in order to group countries with broadly similar economic and epidemiological characteristics. Significantly, it was the infectious diseases and malnutrition that in both periods caused the most concern among Member States in the greater part of the world, particularly in the developing countries. Moreover, the infectious diseases most frequently mentioned for 1957-60 were still those of importance ten years later; among them are tuberculosis, diarrhoea and dysentery, malaria, parasitic and venereal diseases, and a number of virus diseases. In all the regional groupings with a preponderance of developing States, the infectious diseases made up between five and nine of the first ten problems to which governments particularly drew attention.

1.2 This is not to say that no improvement has occurred over a decade in the developing countries. There have been considerable decreases in infant mortality rates and in death rates at all ages, particularly in children. But the communicable diseases are not yet being controlled to any great extent in these parts of the world, although there are some notable exceptions. The smallpox eradication campaign gives great

promise of eventual success (for the first time all provinces and states of the countries where smallpox is still endemic were brought into the eradication programme in 1972, and, though importations occurred in smallpox-free countries, they were rapidly controlled). In the 20-country programme in Africa the incidence of measles has been greatly reduced. The eradication of malaria has been certified in several countries and the disease has been brought under control in many more.

1.3 However, other parasitic diseases for which simple and specific means of prevention are seldom applicable are widespread and show little diminution. In fact schistosomiasis is spreading rapidly in many areas in which water resources are being developed by the construction of dams and irrigation schemes and to which human migration is attracted. Onchocerciasis—of which blindness is the most important complication—is another problem which could have serious consequences in areas of potential human settlement and economic development such as the Volta River basin.

1.4 Diseases for which specific preventive measures are readily available are also uncontrolled in most of the developing world. In the past three decades diphtheria, pertussis, tetanus and poliomyelitis have ceased to be important public health problems in the developed world because efficient immunization programmes have been established. Effective vaccines against measles and rubella are also available and widely used in North America and Europe. Immunization is the most effective and most rapidly applicable measure of preventive medicine available to health authorities, but in much of the world where the need is greatest it has been insufficiently applied, despite the fact that diphtheria, pertussis, tetanus and measles are important contributors to childhood mortality, and poliomyelitis is fast reaching the epidemic scale that was common in many temperate-climate countries in the prevaccination era. The reasons why immunization has not been applied are many—lack of personnel, shortage of transport and equipment, the high cost of some vaccines and the disinclination of mothers to walk long distances with their children to health centres, when these exist. Another reason, however, is that insufficient operational research has been done on immunization programmes—on the minimum number

¹ *Off. Rec. Wld Hlth Org.*, 1963, No. 122.

² *Off. Rec. Wld Hlth Org.*, 1971, No. 192.

of doses which will give a reasonable degree of control, on the length of the interval which can be left between doses, on how to cover high enough proportions of the susceptibles in a population in the shortest time and with the minimum staff. WHO is studying means of accelerating the development of adequate immunization schemes.

1.5 Among the other communicable diseases, influenza resists control in all parts of the world and the group of respiratory diseases as a whole is among the commonest causes of hospital admission or death in the tropics as well as in cooler climates. Tuberculosis, indeed, is the only disease that occurs in every one of the lists of major public health problems grouped regionally (see paragraph 1.1), regardless of the general state of development of the health services or the economy of the countries included in the groupings.

1.6 New problems also arise from time to time—for example, the widespread outbreaks of haemorrhagic conjunctivitis (clinically acute but fortunately short-lived and apparently without sequelae) that appears to be due to a hitherto unidentified picornavirus (see paragraph 1.71).

1.7 In the long term the abatement of those diseases for which specific measures are not available depends on the improvement of the environment, provision of adequate food and shelter, personal hygiene and health education. Effective epidemiological services are essential for ascertaining the importance of these health problems in varying geographical conditions and for indicating where and how to apply what control measures. The strengthening of national epidemiological services is a prime objective of the Organization, and in numerous countries WHO advisers on epidemiology have been appointed to work with national counterparts in developing these services. Three courses, each lasting several months, are also carried on annually, one in Prague and New Delhi, one in Moscow and Alexandria (both for English-speaking participants) and—starting in 1972—one in Paris and Bobo Dioulasso for French-speaking participants. These are intended to train medical officers in epidemiology in order to establish a cadre of epidemiologists in countries where they are most needed. There were 35 participants from 27 countries in the three courses in 1972-73. In addition, the fourth in a series of interregional seminars on the epidemiological surveillance of communicable diseases was held in October in Nairobi. This dealt with general surveillance methodology and with specific methods for particular diseases, including the zoonoses and food-borne infections, and was attended by 31 participants, also from 27 countries.

Epidemiological surveillance of communicable diseases

Operation of the surveillance system

1.8 Information on the important communicable diseases was disseminated by WHO during the year through the *Weekly Epidemiological Record* and through the daily telex information service that came into operation on 1 February, replacing the daily epidemiological radiotelegraphic bulletin. By this new service notifications received at WHO headquarters on diseases subject to the International Health Regulations and occasionally other communicable diseases of international importance are relayed daily by telex to the six WHO regional offices, which are then in a position to provide, by telex or other means, information that national health administrations may request. Should an episode of particular epidemiological gravity occur, the regional offices concerned circulate the information systematically to the health administrations of countries that may be directly affected.

1.9 In December this daily service was supplemented by an automatic telex reply service operated from Geneva and available throughout the world. Epidemiological information is recorded daily in clear on a perforated telex tape which automatically transmits it to any health administration calling the appropriate telex number. This service operates 24 hours a day, in English and French.¹ In addition, the week's information (which will appear in the *Weekly Epidemiological Record*) is summarized every Friday and recorded on the band. From Friday evening to Monday morning health administrations may call the appropriate telex number to receive a summary of the week's data well before the *Weekly Epidemiological Record* reaches them. This weekly telex summary does not, however, contain the epidemiological notes, summary reviews of communicable diseases, technical guides for surveillance, and similar matter that the *Record* also publishes.

1.10 In the African Region the epidemiological surveillance of communicable diseases, which is centred upon the Regional Office at Brazzaville, is greatly aided by the activities of the two WHO regional centres for epidemiological surveillance in Abidjan and Nairobi, which receive and process information from Member States and also participate in the planning and evaluation of national programmes. In order to avoid overloading national

¹ The information can be obtained by calling telex No. 28150 in Geneva, exchanging identification codes, and composing the symbol ZCZC followed by the symbol ENGL for a reply in English or the symbol FRAN for a reply in French.

administrations and the regional programme of work and to make for better coordination with field activities, a limited list of diseases or groups of symptoms has been established for priority notification in the regional surveillance programme.

1.11 Countries in the Region of the Americas have been asked to report on their immunization programmes, including information on financial support and facilities for storage, transport and application of vaccines. Preliminary steps have been taken to organize a pool for the purchase and distribution of vaccines in the Region. Surveys of virus laboratory facilities have also been made to assess their capabilities and the role they could play in activating surveillance of such diseases as haemorrhagic fever, dengue, yellow fever and influenza. The Center for Disease Control of the Public Health Service in the USA is cooperating in these activities.

1.12 In the Eastern Mediterranean Region, continued emphasis has been placed on developing and establishing epidemiological services at central and peripheral levels in most countries of the Region, and on improving health laboratory and statistical services at the same time. The success of programmes for the control and eradication of communicable diseases depends upon the development of these services. As examples of countries where such activities are being pursued may be cited Afghanistan, where the Organization provided the services of an epidemiologist and a microbiologist for the Institute of Public Health at Kabul, one of the major functions of which is training national health personnel; the Libyan Arab Republic, where an epidemiological services project is conducted in association with a public health laboratory services project, and surveillance programmes for plague, smallpox, cholera, measles and parasitic diseases are in operation; Somalia and Yemen, where the epidemiologists in the smallpox eradication programmes assist in the establishment of epidemiological services and the application of modern techniques for communicable disease control; and the Syrian Arab Republic, where an epidemiological services project was started during the year. In Ethiopia there has been an expansion of WHO's advisory services in epidemiology to provinces where epidemiological units have been established.

1.13 The emphasis in the European Region continued to be placed on the integration of the communicable disease programme with the general public health services and on the promotion of national surveillance programmes for certain important communicable diseases, particular emphasis being placed on cholera, smallpox, measles and rubella. As part of

the gradual expansion of the WHO surveillance programmes, the intercountry programme for the surveillance of poliomyelitis was extended to Finland, the Netherlands, Norway and Spain. In Algeria, an immunological survey helped to determine the population at high risk of certain important communicable diseases that are amenable to control by immunization (poliomyelitis, diphtheria, whooping-cough and measles) and to establish priorities within a national immunization programme. In Morocco, the surveillance and control of enteric infections was given priority.

1.14 Epidemiological surveillance programmes exist in all countries of the South-East Asia Region but the number of diseases under surveillance varies from one to another: some include only the three diseases subject to the International Health Regulations that occur in the Region (smallpox, cholera and plague); others—Mongolia, for instance, where there are epidemiological units in each province—cover all infectious diseases. In the Region as a whole the reporting of diseases subject to the International Health Regulations improved considerably during the year.

1.15 Some progress was made in the Western Pacific Region in the development of epidemiological surveillance. For instance, a plan was prepared covering the organization of an epidemiological unit in Malaysia and its activities up to 1976 within the framework of a WHO-assisted epidemiological services project that began in 1971. In the Republic of Korea, epidemiology and surveillance units have been developed in the National Institute of Health, Seoul, and large-scale surveillance of enteric infections was initiated. In projects with a statistical component, the weekly or monthly disease reporting systems have been improved.

*Diseases subject to the International Health Regulations and under international surveillance*¹

1.16 Contrary to what might have been expected on epidemiological grounds, the further geographical extension of *cholera* seen in 1971 was not maintained in 1972, no country notifying the spread of the disease within its territory for the first time in the present pandemic. It has, however, become established in many countries, and in some instances this led to the importation of isolated cases or groups of cases into other areas where the disease is not normally a problem.

¹ As specified in resolutions WHA22.47 and WHA22.48 of the Twenty-second World Health Assembly.

Cholera, which is dealt with more fully in paragraphs 1.159-1.173, was reported from a total of 38 countries or territories, 6 of these having only imported cases. Up to 22 December 1972, just over 67 000 cases had been reported, compared with a total of 171 329 cases for the whole of 1971.¹

1.17 Cases of *plague* (see also paragraphs 1.179-1.180) in the human population were again reported in the greatest number from the Republic of Viet-Nam, with approximately 1180 cases in 1972. Other countries reporting human plague were Brazil, Burma, Ecuador, Khmer Republic, Lesotho, Libyan Arab Republic, Madagascar, Peru, the United Republic of Tanzania, the USA, and Zaire. The world total for 1972 was 1453 cases, an appreciable reduction from the 3796 cases recorded for 1971. No incident was reported of spread of the disease through international traffic.

1.18 Sporadic cases of *jungle yellow fever* (see also paragraphs 1.63-1.65) occurred in two countries in Africa (Ghana, with 4 cases; and Zaire, with 10 suspected cases), and six countries or territories in the Americas (Bolivia, 8 cases; Brazil, 3; Colombia, 3; Peru, 7; Surinam, 1; and Venezuela, 28).

1.19 The number of cases of *smallpox* increased, with some 65 000 cases reported throughout the world in 1972 compared with over 52 000 cases in 1971. The areas in which this disease was thought still to be endemic during the latter part of the year were confined to Bangladesh, Botswana, Ethiopia, India, Nepal, Pakistan and Sudan. Further information on the global smallpox situation is given in the following section of this chapter. Mention should be made here, however, of an incident that well illustrates the need for alertness to the risk of importation of smallpox into non-endemic areas. Early in the year, returning travellers introduced the disease into Yugoslavia, which experienced its first outbreak for more than 40 years. The importance of vigilance and immediate action and the necessity for thorough epidemiological surveillance were appreciated, however, and led in Yugoslavia to rapid containment of the outbreak and in the Federal Republic of Germany to the prompt detection of a single imported case that caused no secondary spread. Unfortunately, excessive protective measures were taken by several countries against international travellers, measures which in any event would not have prevented the disease from crossing national borders. However, the prompt notification of cases by the Yugoslav authorities greatly assisted in stifling this trend.

1.20 The global situation with regard to *malaria*, which is dealt with in detail in Chapter 2, was very similar to that in 1971. A semi-annual and an annual report on the stages of malaria eradication during 1971 were published in the *Weekly Epidemiological Record*,² as well as accounts of cases imported into malaria-free countries.

1.21 In 1972, as in the previous year, neither *louse-borne typhus* nor *louse-borne relapsing fever* presented problems in international traffic. Nevertheless, louse-borne typhus (see paragraph 1.80) continued to be an important communicable disease problem in Burundi and Rwanda, although the decreasing incidence observed in 1971 continued in 1972. An outbreak was also reported in Lesotho.

1.22 Following the publication in 1971 in the *Weekly Epidemiological Record* of a technical guide for a system of *poliomyelitis* surveillance, a pilot project for intensified surveillance of poliomyelitis was planned, with the primary purpose of testing this guide under field conditions in various parts of the world. Selected countries from all WHO Regions with adequate laboratory facilities will participate in this programme, starting in January 1973 for a period of two years. Notifications of poliomyelitis outbreaks, in compliance with resolution WHA22.47 of the Twenty-second World Health Assembly, were received from Costa Rica, Equatorial Guinea, Nicaragua, Paraguay, the Philippines, Portugal, St Vincent, Trinidad and Tobago, and the USA. (See also paragraphs 1.58-1.60.)

1.23 In 1972 the worldwide network of 92 *influenza* centres made it possible quickly to detect a wave of epidemics in Europe, North America and Asia of varying severity in the countries involved. In the southern hemisphere a certain increase in the general incidence was noted along with localized outbreaks in several countries. Epidemics on a scale approaching, though less than, those in 1969-70 occurred only in parts of Europe, including Bulgaria, Czechoslovakia, Finland, Hungary, Poland, Romania and Sweden (see also paragraphs 1.48-1.53).

1.24 An increased number of national centres is participating in the WHO-sponsored programme of surveillance of *Salmonella* and outbreaks of food-borne diseases. This programme is additional to that for the surveillance of the diseases reviewed above, and includes the surveillance of typhoid and paratyphoid

¹ *Wkly epidem. Rec.*, 1972, 47, 281-283.

² *Wkly epidem. Rec.*, 1972, 47, 93-107, 353-366.

fevers, and covers both man and the environment (food products, animal feeds, domestic animals, water).¹ Returns from the participating centres show that *Salmonella typhi* and *S. paratyphi* were frequently found in a number of African and European countries. However, in the 16 European centres, the notified frequency of isolations in 1970 of these two serotypes was lower than in 1969 and that of other serotypes generally higher. *S. typhimurium* remained the predominant serotype in most centres; but *S. enteritidis*, the frequency of which has risen in many countries, ranked first among the isolations in four centres (Austria, Federal Republic of Germany, Poland and one of the two laboratories in Yugoslavia), and *S. panama* predominated in two centres (France and Romania).

1.25 An important epidemiological event was an outbreak of typhoid fever in Mexico starting in January, in which for the first time chloramphenicol-resistant strains of *S. typhi* were isolated (see also paragraph 1.174); cases were imported into the United Kingdom and the USA.

Committee on International Surveillance of Communicable Diseases

1.26 Regrettably, the smooth operation of the International Health Regulations continued to be hampered by the reluctance of some Member States promptly to notify the presence of cases of the diseases subject to these Regulations and by the adoption of excessive measures against international travellers in the hope of preventing the introduction of certain diseases, in particular cholera and smallpox. The seventeenth meeting of the Committee on International Surveillance of Communicable Diseases was held in November to review the functioning of the International Health Regulations. Two items of particular interest on the agenda of this meeting were a study of the implications of the removal of cholera from the Regulations, undertaken in conformity with resolution WHA24.26 adopted in 1971 by the Twenty-fourth World Health Assembly, and a study of the mandatory administration of medication to international travellers, a measure resorted to by some Member States in an effort to minimize the spread of infectious agents and of the cholera vibrio in particular.

1.27 In 1970, at its sixteenth meeting the Committee, although recognizing that there were no grounds for suspecting containers to be a hazard to international

health, had recommended that States be encouraged to report to the Organization any problems they might encounter in this respect. At its seventeenth meeting the Committee took cognizance of a report noting that 21 governments which had provided information on this question confirmed that container traffic had not created any health problems but that the situation was being watched. In this connexion, WHO was represented at the United Nations/IMCO Conference on International Container Traffic in Geneva in November, which adopted a recommendation on the means by which health formalities at frontiers could be facilitated and accelerated in respect of container traffic.

1.28 The Committee on International Surveillance of Communicable Diseases also considered expert reports on two formulations of pyrethroid insecticides (see paragraph 3.41) for aircraft disinsection. Noting that a decision on their airworthiness aspects was awaited from ICAO and that long-term animal toxicity studies were nearing completion, the Committee formulated recommendations for submission to the Twenty-sixth World Health Assembly.

Smallpox

1.29 During 1972, the sixth year of the intensified smallpox eradication campaign, programmes were extended to include, for the first time, all provinces and states of the remaining countries in which the disease was considered endemic. With improved surveillance and more complete notification in these and other countries, the reported number of cases increased to some 65 000, as against more than 52 000 reported for the previous year. However, the geographical extent of endemic smallpox continued to decrease as Afghanistan and Indonesia became free of the disease. During the last half of the year, smallpox was considered to be endemic in only seven countries: Bangladesh, Botswana, Ethiopia, India, Nepal, Pakistan and Sudan. Over 70% of all cases were reported by Ethiopia and India.

1.30 As a result of importations, smallpox occurred during 1972 in 10 countries or territories which are or had been considered to be non-endemic. In the Federal Republic of Germany, Somalia, South Africa, Sri Lanka, Syrian Arab Republic, Uganda and Yugoslavia prompt and effective containment measures were applied and the outbreaks were rapidly terminated. In the French Territory of the Afars and Issas and in Iran and Iraq transmission was stopped but with some difficulty.

¹ See also paragraphs 1.174-1.178 and 1.225-1.233.

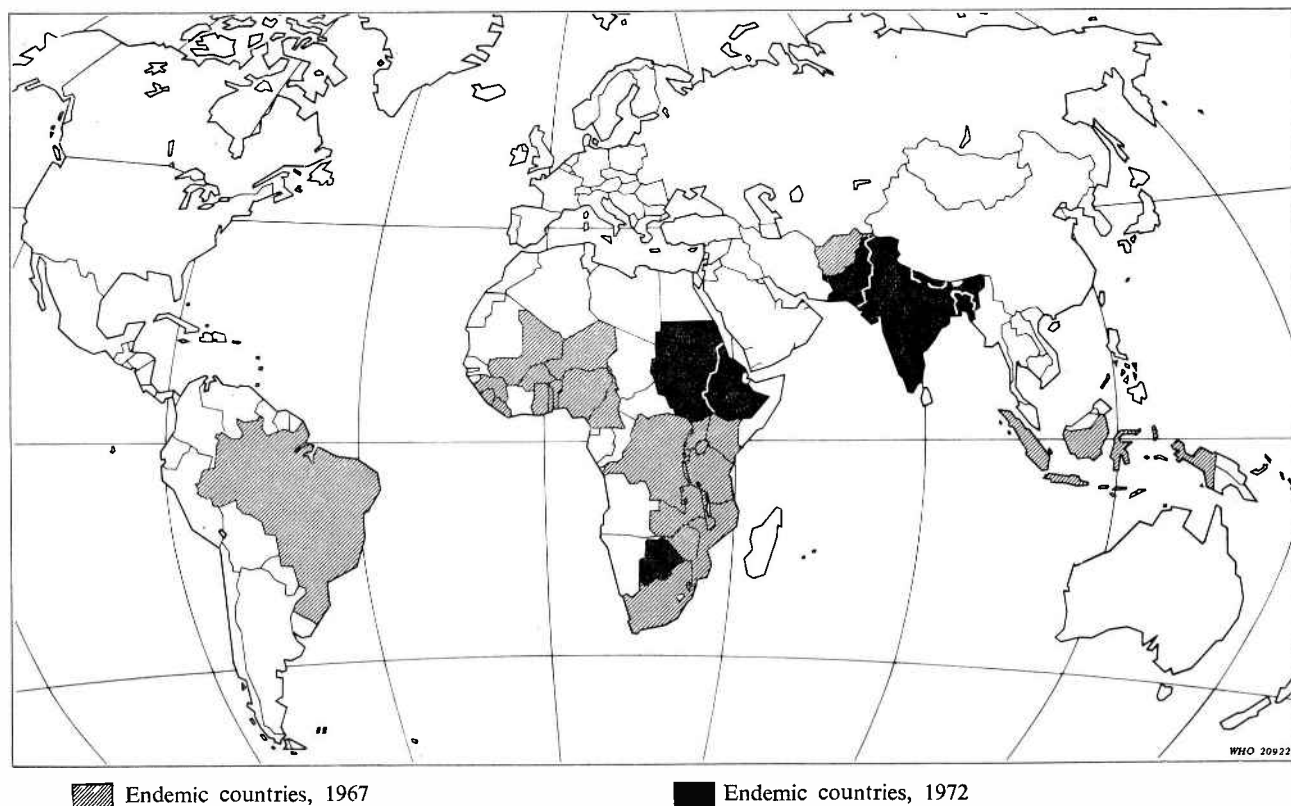
1.31 Progress in the eradication campaign since its inception in 1967 is illustrated in Fig. 1, which shows, in black, the countries in which smallpox was endemic in 1972 and, in shading, those in which it was endemic in 1967 but where transmission has since been interrupted. In this period, the number of countries and territories reporting cases of smallpox decreased from 42 to 19 and the number of endemic countries from 30 to 7.

1.32 With the extension of surveillance activities into all states and provinces throughout the currently endemic countries, the campaign embarked in September upon what is viewed as its final phase, in the expectation that smallpox transmission can be reasonably rapidly interrupted. In the strategy for this phase the primary emphasis is on surveillance activities, stressing the prompt investigation of every case, containment of the outbreak and search for the source of infection. In areas where reporting is deficient, active searches for cases will be conducted. The strategy for this phase of the campaign was further elaborated and adapted to different national conditions during interregional seminars held in the autumn in Addis Ababa, Karachi (Pakistan), and New Delhi.

1.33 The Americas now appear to be free of smallpox—450 years after it was first introduced. The last known outbreak (a very localized one) was discovered and contained in April 1971 in Rio de Janeiro. Since that time, the reporting network in Brazil, now consisting of more than 5000 notification posts, has detected no cases. National and state surveillance officers have conducted repeated systematic search operations in all remote areas where cases could conceivably escape detection. All suspect cases have been carefully investigated and none has been found to be smallpox. A similar absence of smallpox cases has been confirmed in the course of systematic vaccination programmes and surveillance operations in other countries of the Americas. Vaccination programmes and surveillance activities are continuing in the Region of the Americas to provide additional assurance that transmission has been stopped.

1.34 In western and central Africa, comprising 20 countries and a population of more than 120 million persons, there has still been no case of smallpox discovered since May 1970. Smallpox programmes in this area have now been transformed into more general communicable disease control activities em-

Fig. 1. Countries with endemic smallpox in 1967 where transmission has since been interrupted, and countries where smallpox remained endemic in 1972



bracing surveillance and immunization for a number of diseases in addition to smallpox, including cholera, yellow fever, measles, tuberculosis and poliomyelitis.

1.35 In eastern and southern Africa, endemic smallpox during 1972 was present only in Botswana, Ethiopia and Sudan. However, WHO-assisted programmes continued in 13 countries as the risk of smallpox reintroduction remains a serious threat to the whole continent. During the year, in fact, Uganda reported a series of imported cases from heavily endemic areas of southern Sudan and major outbreaks occurred in the French Territory of the Afars and Issas following importations from Ethiopia. Five cases were also introduced into Somalia from Ethiopia. In Botswana, which had been free of smallpox since 1964, cases, thought to be imported, occurred early in 1971. Initial, limited efforts to contain the spread of infection were unsuccessful, and many areas had become infected by April 1972, when intensive containment measures were begun. More than 1000 cases occurred during 1972, before the outbreaks could be effectively brought under control late in the year. In Ethiopia an eradication programme began in five provinces in January 1971 and was extended throughout the country by mid-year. With an emphasis on reporting and surveillance, the number of notified cases rose precipitously—from 722 in 1970 to 26 329 in 1971. After March 1972, the incidence began to decline and by the end of the year it appeared that transmission in 6 of the 14 provinces had been virtually interrupted. So far, more than 6 million people in the country have been vaccinated by surveillance teams and cooperating health services. With the end of civil disturbances in Sudan, that country's programme was intensified throughout the area of heavy endemicity in the southern provinces. In the six northern provinces, however, the incidence remained low and virtually all outbreaks could be traced to importations from the southern provinces or Ethiopia.

1.36 In Asia, endemic smallpox persisted in India, Nepal and Pakistan and became re-established in Bangladesh. However, during the year transmission appears to have been interrupted both in Afghanistan and in the only part of Indonesia (West Java) where it was known still to occur. All cases in Afghanistan which were detected after February could be clearly documented as having resulted from importations by nomadic tribes which annually migrate to and from endemic areas in Pakistan. The last known cases (34) in Indonesia occurred in January, following which nationwide search operations were undertaken by regular staff of the smallpox eradication programme and by special teams; no cases could be discovered.

For the second successive year India recorded an increase in the number of cases, attributed to continued improvement in surveillance and more complete notifications. The principal endemic areas are now found in five central and northern states (Uttar Pradesh, Madhya Pradesh, West Bengal, Bihar, and Jammu and Kashmir), which together recorded 80% of all cases in India. In the autumn, specially intensified programmes were initiated in these as well as other northern states. During the year, the programme in Nepal was extended into the remaining western zones. A number of large outbreaks were detected and contained; except for a few outbreaks originating in neighbouring states of India, no cases were detected in Nepal after June. In Pakistan, smallpox transmission was mainly confined to a major focus in the northern part of Sind Province and to areas in this and the neighbouring provinces that this focus was serving to infect. Bangladesh, apparently free of smallpox since August 1970, experienced severe epidemics coincident with the return of refugees from India early in 1972. Major emergency measures have been taken but more than 10 000 cases had been reported by the end of the year and control had not been achieved.

1.37 Continuing their indispensable work on behalf of the Organization, the WHO International and Regional Reference Centres for Smallpox Vaccine in Utrecht, Netherlands, and Toronto, Canada, respectively, provided training and consultation for producers from laboratories in the endemic areas and tested more than 300 vaccine lots during 1972. Donations to the Special Account for Smallpox Eradication (see also paragraph 15.27), principally in the form of vaccine, were received during the year from Argentina, Belgium, Brazil, Canada, Colombia, Greece, Kenya, Netherlands, New Zealand, Peru, Switzerland, USSR, and Yugoslavia. More than 42 million doses of vaccine were distributed. Considerable quantities of vaccine were also made available through bilateral assistance by the USA and the USSR to programmes in Africa and Asia.

1.38 The Organization has pursued its investigations of human cases of monkeypox, referred to in the Annual Report for 1971.¹ The available information to date was summarized by collaborating investigators in a series of nine papers in the *Bulletin of the World Health Organization*.² Five additional cases have since been discovered—one in the Ivory Coast in December 1971 and four in Zaire between March and

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.32.

² *Bull. Wld Hlth Org.*, 1972, 46, 567-639.

October 1972. Like the seven other human infections, these occurred as single cases in remote villages, and no person-to-person transmission could be demonstrated despite the patients' close contact with a number of susceptible persons. Epidemiologically, human monkeypox seems to be quite different from smallpox, apparently resulting from a fortuitous infection with an animal virus; but clinically and serologically the two diseases are virtually indistinguishable and their differentiation depends upon isolation of the causative virus. It is therefore important to carry out thorough laboratory and epidemiological investigation of all suspect smallpox cases: mistaking either disease for the other could distort the conduct and evaluation of smallpox eradication programmes.

1.39 WHO also encouraged research in the identification and characterization of variola virus strains and the development of tissue culture and attenuated vaccines which might reduce pathogenicity and increase immunogenicity. The WHO International Reference Centre for Smallpox, Moscow, and the Regional Reference Centre for Smallpox, Atlanta, Ga., USA, maintained a constant surveillance of variola virus isolates from various parts of the world and provided training in smallpox laboratory diagnosis.

1.40 The Organization distributed during the year more than 200 000 copies of the diagnostic wall charts, smallpox recognition cards and teaching slides that have been prepared in recent years to assist in surveillance activities and in the clinical diagnosis of smallpox in African and Asian patients. Requests continued to be received from a number of laboratories for copies of the illustrated guide to the laboratory diagnosis of smallpox.¹ National diagnostic laboratories in the endemic areas were supplied by WHO collaborating laboratories with the standard reagents for the tests described in the guide.

1.41 Information on the progress of the programme and related epidemiological matters was published at intervals in the *Weekly Epidemiological Record*, and a review of the smallpox situation was presented in the *WHO Chronicle*.² The October issue of *World Health* was also devoted to smallpox.

1.42 The Organization maintained close collaboration with countries providing bilateral assistance, and with UNICEF, the League of Red Cross Societies and other organizations assisting the programme.

Virus, rickettsial and related diseases³

Virus reference centres

1.43 During the year, the 32 international and regional reference centres for viruses, rickettsiae, mycoplasmas and chlamydiae (whose activities were described in some detail in the Annual Report for 1970)⁴ increased their already extensive contribution of advice, services and scientific materials to national laboratories—particularly in developing countries where the number of virus laboratories and of virologists is small, and where the supply of reference and diagnostic reagents by the reference centres releases the staff from the time-consuming process of preparing their own reagents, enabling them to give their clinical and epidemiological colleagues a more comprehensive service.

WHO team for special studies in virology in Africa

1.44 At the East African Virus Research Institute, Entebbe, Uganda, the staff of the WHO team carrying out special virological studies and assisting the East African Community is now complete—three virologists, three senior technical officers, an administrative assistant and auxiliary laboratory staff. In addition, there are two part-time epidemiologists; one concerned mainly with clinical epidemiology and the other with field epidemiology.

1.45 The team's programmes were reviewed in March by its scientific advisory committee. In the past year an investigation has been carried out into poor responses to live poliovirus vaccines in children attending a clinic about 30 km from Kampala. In this study, type 1 poliovirus vaccine was fed to 179 infants who had no type 1 antibody, divided into four groups—two of breast-fed children and two of bottle-fed children. One of the breast-fed and one of the bottle-fed groups received vaccine along with 0.5 ml of an antihuman gamma-globulin horse serum. The children in the other groups were given vaccine alone. The aim was to determine the role of breast milk in lowering the seroconversion rate and to find out if the serum would temporarily neutralize the breast milk antibodies. Contrary to expectation, the children fed serum plus vaccine, whether or not breast-fed, had considerably better conversion rates than those given vaccine alone. These results suggest that breast-feeding did not influence the conversion rates and that an inhibitor which is not associated with breast milk but which is sensitive to a component of

¹ World Health Organization (1969) *Guide to the laboratory diagnosis of smallpox for smallpox eradication campaigns*, Geneva.

² *WHO Chronicle*, 1972, 26, 393-400.

³ See also paragraphs 1.245-1.249.

⁴ *Off. Rec. Wld Hlth Org.*, 1971, No. 188, p. 17.

the serum must be present in the gut. Whether this inhibitor is "antibody" or perhaps a component of one of the solid foods commonly given to babies (bottle-fed or not) is now being investigated.

1.46 A study of the viruses responsible for respiratory infections in children attending the same clinic and in patients admitted to hospital with severe respiratory infections has been set up. On the advice of the scientific advisory committee strenuous efforts are being made to obtain paired samples of serum, taken in the acute and convalescent phases of infections of unknown origin, routinely from patients in hospital or attending suitable clinics. Obtaining paired samples of this kind, though technically simple, is in practice exceedingly difficult, partly because patients often attend the clinic or hospital for the first time late in their illness, partly because the stay in hospital of even seriously ill patients is often a matter of only a few days, and partly because follow-up visits by discharged patients to outpatient departments are very irregular. However, with the assistance of the WHO virus reference centres sera so collected could be tested against a comprehensive battery of viral antigens covering all groups of viruses, providing reliable information on the etiological agents of importance in that part of Africa, some of which may not previously have been identified there. The potential importance of these examinations is such that the effort to obtain suitable material is justifiable, however difficult it may be.

1.47 Other studies by the team include investigations of the effect of different viruses on organ-cultures of tissues from cases of Burkitt's lymphoma (there is some evidence suggesting that natural infection with measles virus has led to regression of the tumours) and serological studies on the prevalence of rickettsial infections. The virologists in the team share with the staff of the Institute the undergraduate and post-graduate teaching in virology at Makerere University. Contacts with microbiologists, epidemiologists and entomologists in the other countries of the East African Community and in the neighbouring countries are being developed.

Influenza

1.48 About the end of September 1971 a rapid increase in the number of cases of influenza due to virus A occurred in north-east Romania and the disease spread through the whole country by the end of October. In Bulgaria experience was similar over the same period and in Hungary there was an extensive epidemic in November. These foci in south-eastern Europe spread west and north and by mid-January

1972 large outbreaks were being reported from most countries in western Europe and Scandinavia. European and Asian parts of the USSR were also affected. The disease was generally mild, however, and sickness-absence was less than might have been expected. In the countries taking part in the WHO collaborative study of "excess mortality" from respiratory diseases,¹ deaths from respiratory diseases exceeded the expected number, but the total was considerably less than those recorded in the two preceding epidemics (1967-68, 1969-70).

1.49 In the southern hemisphere outbreaks were reported from South Africa in May and from Argentina in June. In South Africa outbreaks continued into June, and a considerable increase was reported from New Zealand in July, and later from Australia.

1.50 During the epidemic season in England one strain of virus A (out of more than 700 examined) was isolated which had an antigenic pattern differing considerably from that of the original Hong Kong strain, though still retaining some of the latter's characteristics. Up to April 1972 this new variant (A/England/42/72) was very rarely isolated except in southern India, where it is now realized that it was the predominant strain in cases diagnosed between July and December 1971. From May 1972 onwards it became prevalent in outbreaks in Malaysia, Singapore and Australia, and later spread throughout the world.

1.51 Vaccine for the 1972-73 season in the temperate countries of the northern hemisphere was prepared about the middle of 1972, but efforts were also made to prepare vaccine containing the new variant.

1.52 Few infections with influenza virus B were reported.

1.53 WHO-coordinated studies on the development of live influenza virus vaccines continued during the year, and pilot studies in volunteers are being organized.

Virus reporting system

1.54 In 1972 two further laboratories, one in the African and one in the Eastern Mediterranean Region, joined the WHO system of collection and distribution of information on viral infections other than influenza and arboviruses. The total number of countries at present participating in the scheme is 35 (with 97 laboratories), compared with seven countries and 11

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraphs 1.45-1.47.

laboratories when the reporting system was initiated in 1963. The total number of reports for 1972 was some 37 000, in comparison with less than 8000 received in 1963.

1.55 A study of the reports made to WHO on enteroviruses other than poliovirus—that is, coxsackievirus groups A and B and the echoviruses—during the four-year period 1967-70 was published,¹ and a similar study of virus infections associated with central nervous system disease is under way.

Viral hepatitis

1.56 There has been considerable confusion in recent years in the nomenclature of viral hepatitis, particularly since the recognition of the association of "Australia" antigen with serum hepatitis, different workers using different terms for the same entity. The WHO Scientific Group on Viral Hepatitis that met in Geneva in September recommended that infectious or epidemic hepatitis should be called viral hepatitis type A and serum hepatitis viral hepatitis type B. The Australia or hepatitis-associated antigen should be designated hepatitis B antigen (HB Ag) and the antibody hepatitis B antibody (HB Ab).

1.57 The few advances in hepatitis type A since the last meeting of the WHO Expert Committee on Hepatitis in 1963 were reviewed but the discussions were mainly on viral hepatitis B and the hepatitis B antigen. The epidemiology in temperate climates was considered in relation to blood donors, blood products, drug addicts, and renal dialysis and transplantation units. In relation to warm-climate countries (where the frequency of hepatitis B antigen in apparently healthy persons is 10- to 100-fold greater than in temperate climates), discussion centred on the possibility that infection might be spread by blood-sucking insects and on the possible association between the presence of antigen and cirrhosis and liver cell carcinoma. It was specifically recommended that blood containing hepatitis B antigen should not be used for transfusion and that special studies should be set up to detect whether infection could arise from carriers in the medical and allied professions. The value of specific hepatitis B immunoglobulin for protection should be investigated, particularly where there was evidence of accidental exposure to known infectious material. The scientific group also prepared an outline of procedures for control of hepatitis in dialysis and transplantation units and a model code of laboratory practice.

¹ Assaad, F. & Cockburn, W. C. (1972) *Bull. Wld Hlth Org.*, 46, 329-336.

Poliomyelitis

1.58 Poliomyelitis continues to be under control in the developed countries but to increase in importance as a public health problem in the developing countries. For example, an extensive outbreak which lasted six months occurred in Malaysia, where an intensive surveillance programme has now been established.

1.59 In 11 countries in which large-scale vaccination has been done WHO is coordinating a programme for the investigation of persistent spinal paralysis typical of poliomyelitis and its relation to poliomyelitis vaccine. Seventy-two cases in 1970 and 64 in 1971 were reported to WHO (by no means all of them were vaccine-related) and in October a consultation was held to review the findings of the first two years' work. It was concluded that the information so far obtained demonstrated the great value of the scheme as a system for monitoring the safety of poliovirus vaccines from different sources and that the scheme should if possible be extended to cover other countries.

1.60 At this consultation two other studies on poliomyelitis being made under WHO's auspices were also reviewed. The first concerns the poor serological response to live poliovirus vaccine in children in the tropics, described above in paragraph 1.45. The second is a very detailed investigation of marker tests for the intratypic differentiation of polioviruses. The objective is to standardize the tests and establish a uniform system of classification, which is essential for differentiating wild from vaccine-derived strains. This study, which is still in an early stage, is being carried out in six laboratories—in Canada, Hungary, Poland, Romania, the United Kingdom and the USA—on strains of virus isolated in the 11-country epidemiological programme mentioned above.

Measles and rubella

1.61 In the African Region the extensive programme for the control of measles (associated with the smallpox eradication campaign) continues in 20 countries in western and central Africa under the aegis of USAID and with WHO support and participation. The support of WHO to other measles control programmes in Africa is limited by the high cost of the vaccine, the difficulty of maintaining adequate refrigeration facilities in distant areas, and manpower shortages.

1.62 In the European Region a working group on measles vaccination met in Algiers in April 1972 and a similar group on the prevention of rubella in Buda-

pest in June. The experience of European countries using measles vaccine on a large scale was reviewed and proposals for vaccination programmes adjusted to the differing conditions in individual countries of the Region were discussed. On rubella vaccination, it was agreed that the subject required further study before a decision could be made on an effective and economical programme by which the frequency of congenital rubella defects in children whose mothers were infected early in pregnancy could be substantially reduced. During the first half of 1972 Bohemia and Moravia in Czechoslovakia suffered one of the most intense rubella epidemics that has been recorded in Europe, with an average of 2100 cases weekly in January and of nearly 10 000 in April. Most cases occurred among prepubertal children, and most of the girls in this group may now be assumed to be protected against the risk of bearing children with congenital defects from this cause. It is interesting that an immunological survey conducted before the epidemic showed that 96-100% of women 20-40 years old already had protective antibody.

Arboviruses

1.63 For the first time since 1966 jungle yellow fever cases occurred in the western states of Venezuela. There were 28 deaths, almost all of young men working in densely forested areas. Extensive fatal epizootics among monkeys preceded the occurrence of human cases. A few cases were noted elsewhere in the Region of the Americas. In Africa, four cases were found in Ghana, and 10 deaths from suspected yellow fever occurred in the Oubangui district of Zaire in an area where *Aedes aegypti* is present.

1.64 The permanent threat of more severe epidemics arising from such beginnings in endemic areas has led the Organization progressively to help national laboratories to strengthen the capabilities for yellow fever surveillance. The use of viscerotomes is being especially encouraged in Africa: they have been distributed to WHO representatives in countries where they may become necessary and there is a depot of them for use in emergency situations at the epidemiological surveillance centre in Abidjan. Over 500 000 doses of yellow fever vaccine from the WHO reserves were distributed as emergency stock to meet requests from countries in the Region. Virologists from the regional arbovirus reference centres and from WHO visited the national laboratories in countries of South America and Africa to strengthen cooperation within the network of laboratories engaged in yellow fever surveillance.

1.65 Many points remain obscure concerning the reservoir and the spread of the yellow fever virus, and WHO is encouraging studies to bring about a better understanding of the basic epidemiology of the disease. The ecological, epidemiological, clinico-pathological and entomological aspects of the epidemic in the Jos plateau area of Nigeria in 1969 were studied by a group in the WHO collaborating laboratory at the University of Ibadan and their reports have now been published.¹ Extension of the serological survey undertaken in the Ivory Coast by the Institut Pasteur, Dakar,² has shown that there is a high proportion of monkeys with recently acquired yellow fever antibodies in the south-western part of the country. Extensive economic growth is planned in both the inland and coastal parts of this area, and with WHO support a special survey is therefore being made there of the immune status of the human population. It is already known from a survey conducted by the Institut Pasteur in Dakar and the Organization for Coordination and Cooperation in the Control of Major Endemic Diseases (OCCGE) that there is a large proportion of children susceptible to yellow fever in villages along the Atlantic coast.

1.66 Lassa fever virus, which was first isolated in north-eastern Nigeria in 1969, was responsible in 1970 for a localized epidemic there with a death rate of 50%. In 1972, another outbreak occurred in Liberia. The virus spread among patients in the hospital of Zorzor, indicating its ready capacity to spread directly from man to man. There was also evidence that cases in Sierra Leone in 1972 represent the continuation of an outbreak that began in 1970. Here again, transmission among family contacts and hospital infections were characteristic epidemiological features. Among 64 suspected cases hospitalized in Panguma and Tongo hospitals between October 1970 and October 1972 (8 confirmed serologically), the case-fatality rate was 36%; however, a mortality of the order of 6% among all infected persons is indicated by evidence from serological surveys. The rapid spread of this newly recognized disease has prompted WHO to initiate a serological survey in West Africa to ascertain its geographical extent and its real prevalence, including subclinical cases.

1.67 Another dangerous arbovirus has been described as Crimean haemorrhagic fever virus in central-eastern Europe and as Congo virus in East Africa. The WHO International Reference Centre for Arboviruses, New Haven, Conn., USA, has shown

¹ *Bull. Wld Hlth Org.*, 1972, 46, 641-673.

² See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.63.

that these two agents are antigenically identical. Although it has been rather extensively studied in its European focus, particularly in the USSR, further information is needed on its epidemiological significance in its other main focus—across central Africa—where strains are frequently isolated from cattle and ticks, and where human infections may give rise to haemorrhagic febrile syndromes as in the USSR. A collaborative study coordinated by WHO is under way at the WHO International Reference Centre for Arboviruses, the regional reference centres in Dakar, Entebbe and Moscow, and the Virus Laboratory at the University of Ibadan, Nigeria. This study will include investigation of the role that migratory birds may play in the exchange of virus between the two foci. This exchange might be due to the birds carrying infected ticks from one focus to the other or to viraemia in the birds themselves.

1.68 Epidemics of dengue virus infection increased in number and intensity in 1971 and 1972, particularly in islands of the south-western Pacific and in the Caribbean. In 1972 over half a million cases of dengue fever occurred in Colombia following reinfestation of the Atlantic coastal areas by *Aedes aegypti*. Endemic dengue persisted in the Region of the Americas in the Dominican Republic, French Guiana, Haiti, and Puerto Rico. Especially in South-East Asia, there is a tendency for haemorrhagic manifestations to occur, both in children and in adults, when there is hypersensitivity to the virus, notably when one dengue virus type is superseded by another in a human population. This has lent added interest to the studies on the immunopathology of the haemorrhagic shock syndrome that are being coordinated and financially supported by WHO in Bangkok, another area where the disease is endemic.

1.69 Venezuelan equine encephalitis reappeared in Ecuador in March 1972 and this was followed by successive outbreaks in Guatemala, El Salvador, Colombia and Mexico. The virus was of the same subtype as that which prevailed in 1971, producing a highly fatal disease in horses and mild influenza-like symptoms in man with occasional neurological complications (see also paragraph 1.202).

1.70 More than 300 arboviruses have been described; a little more than 50 of them are recognized as pathogenic in man, but many others have not been fully investigated. To stimulate study of these and to make the results known to others WHO operates a system for the collection and dissemination of information on arboviruses similar to that for other viruses referred to in paragraph 1.54. Quarterly and annual

reports on isolations and serological findings are circulated to the participating arbovirus laboratories, of which there were 70 in 1972. The reporting forms have been designed for storage and processing of the information by computer, as for other viruses.

Epidemic haemorrhagic conjunctivitis

1.71 Since 1969 epidemics of an acute haemorrhagic conjunctivitis, first observed in Africa, have occurred in a number of countries in all WHO Regions except the Americas. Several African and Asian countries were affected in 1972. The outbreaks are characterized by a rapid spread in communities and by very acute clinical manifestations. However, the disease resolves spontaneously in a few days, apparently without sequelae. The etiological agent appears to be a new type of picornavirus of which isolates have been obtained from different parts of the world. WHO is encouraging and contributing to investigations of this type of conjunctivitis, which apparently represents a new entity, by facilitating contacts between research workers in different countries and by coordinating or promoting exchanges of material and of information.

Insect viruses

1.72 The problems associated with the continued large-scale use of chemical pesticides have intensified the search for other means of control of agricultural and forestry pests and of insects which carry infections pathogenic to man. One possibility is the use of viruses which are pathogenic for the insects which it is necessary to control. Such biological control measures are at first sight very attractive because they are in essence an extension of natural control measures. However, WHO has approached this matter very cautiously, because a virus, once released, cannot be controlled and the possibility (although probably very remote) must be borne in mind that by mutation, recombination or adaptation viruses might arise which could infect beneficial insects or even birds or mammals.

1.73 A joint meeting of an FAO Working Party of Experts on Pest Resistance to Pesticides and an *ad hoc* WHO group was held in November at which the present status of the use of viruses pathogenic to insect pests was discussed. Particular emphasis was placed on the need to ensure that such viruses were safe. It was considered that the nuclear polyhedrosis viruses and granulosis viruses offered the greatest potential among the viruses of invertebrates, but that other groups might present more difficulty, particularly as to their specificity. It was pointed out that more information on the physical, chemical and

biological properties of viruses of invertebrates was needed to determine their patterns of specificity, and that the solution of some very difficult problems of possible carcinogenicity and teratogenicity hinged upon further progress in fundamental virology and rigorous safety testing. Other risks were also examined, notably the possible allergenicity of preparations containing these viruses.

1.74 For these reasons, the meeting recommended that countries contemplating the use of viruses of invertebrates as biological control agents should establish a control authority to regulate strictly their development and use. Any candidate virus, selected after thorough laboratory studies, should be submitted to a staged programme of field testing, every care being taken to keep to the minimum the spread of the agent beyond the target area. The environment where such field trials might take place would have to be diligently monitored for a long time to detect any harmful effects.

*Trachoma*¹

1.75 Trachoma control programmes assisted by UNICEF and WHO during the period 1948-70 were reviewed at the nineteenth session of the UNICEF/WHO Joint Committee on Health Policy held in February 1972.² The Committee endorsed the present control methodology, which emphasizes that the success of treatment need not necessarily be measured in terms of cure rates. Reduction of the severity of the disease and prevention of complications considerably decrease the risk and public health significance of trachoma. The Committee also endorsed the current stress on the use of uniform methods in order to allow for better evaluation of the results, on training and health education activities, and on integration into basic health services whenever possible. The Committee recommended continuation of the assistance along these lines and increased support to research aimed at improving the methods for the diagnosis, treatment and control of trachoma.

1.76 Direct WHO assistance in the form of personnel, supplies and support for training abroad continued to be given in 1972 for five national projects in which trachoma control is the main or an important element (in Algeria, Burma, Libyan Arab Republic, Syrian Arab Republic, and the United Republic of Tanzania). Assistance was also provided on an inter-country basis for three national projects in the southern area of the European Region (in Morocco, Turkey,

Yugoslavia) as part of a programme which also deals with other causes of blindness or visual impairment. In the African Region, in addition to the United Republic of Tanzania, several other countries are interested in initiating or extending measures for control. In the Eastern Mediterranean Region advisory services were also provided to countries other than the two named above where trachoma and associated infections are still an important cause of loss of vision. For instance, a study of the prevalence of communicable eye diseases in Abu Dhabi, United Arab Emirates, demonstrated that trachoma is widespread, especially in children, and that trichiasis is common; the main causes of impairment of vision are infections of the cornea, cataract and glaucoma. A programme for control of communicable eye diseases was prepared and agreed on by the national authorities. In Egypt, where measures for the control of communicable eye diseases were reviewed, it was found that trachoma still presents a considerable public health problem, especially in the rural areas.

1.77 Financial support for research activities was given to laboratories in Australia, Denmark, France, Israel, the United Kingdom, the USA and the USSR. Part of these activities are carried out in collaboration with the WHO International Reference Centre for Trachoma and Other Chlamydial Infections, in San Francisco, USA, which provides reference services and reagents to a number of laboratories in different countries. These research activities are mostly oriented towards the improvement of diagnostic and therapeutic methods. A collaborative study on the laboratory diagnosis of trachoma indicates that reproducible and comparable results may be obtained by different laboratories using the complement-fixation test and that the positivity rates so obtained are correlated with the degree of endemicity of the disease. The results of another collaborative study in which clinical and laboratory diagnoses were compared are being collated.

1.78 Field research has also been started within some of the programmes. This consists of comparative therapeutic trials on a relatively large scale and is aimed at obtaining a better definition of the benefits which may result from the use of different schedules of treatment or of different antibiotics already known to be safe and effective.

Other chlamydial infections

1.79 A collaborative study on the laboratory diagnosis of chlamydial infections in general has been set up in order to evaluate the reproducibility of results obtained in different laboratories using different

¹ See also paragraphs 1.251-1.253.

² *Off. Rec. Wld Hlth Org.*, 1972, No. 203, Annex 2, pp. 19-21.

techniques. The final aim of this study, being carried out in seven laboratories in five countries (Denmark, France, the United Kingdom, the USA and the USSR), is to select the methods most likely to help in evaluating the role of chlamydiae as agents of communicable diseases of public health significance, and especially of respiratory and venereal infections.

Rickettsial diseases

1.80 Endemic foci of louse-borne typhus persist in several countries, particularly in Africa and in parts of Central and South America. Assistance in the form of drugs was given to the Governments of Burundi and Rwanda, and advisory services and drugs and vaccine were provided in April for Lesotho in response to the Government's request following an outbreak there.

1.81 The Organization held a consultation on the rickettsial diseases programme in June. The need for further studies on these diseases, and especially on the properties of and indications for existing vaccines was stressed. Collaborative investigations into problems connected with vaccine are now in progress in Czechoslovakia, the USA and the USSR.

1.82 A collaborative study on the laboratory diagnosis of louse-borne typhus in endemic areas and another on the laboratory diagnosis of rickettsial infections in general are at present in progress. These two studies are carried out in laboratories in Belgium, Burundi, Czechoslovakia (at the WHO Regional Reference Centre for Human Rickettsioses, Bratislava), France, Rwanda, Uganda (at the laboratory of the WHO team for special studies in virology, Entebbe), the USA (including the WHO Regional Reference Centre for Human Rickettsioses, Hamilton, Mont.), and the USSR.

Endemic treponematoses and venereal diseases

Endemic treponematoses

1.83 Over the past two decades mass penicillin campaigns for the control of the endemic treponematoses of childhood have been carried out in 46 countries, usually with assistance from WHO and UNICEF. By 1970, more than 160 million people had been examined and 47 million clinical and latent cases and contacts treated. In 1970 alone, 2.5 million survey and 37.2 million resurvey examinations were made and over 800 000 persons treated. The result has been a spectacular drop in the prevalence of these infections in the world, although some active clinical cases are still reported in areas where surveillance and epidemio-

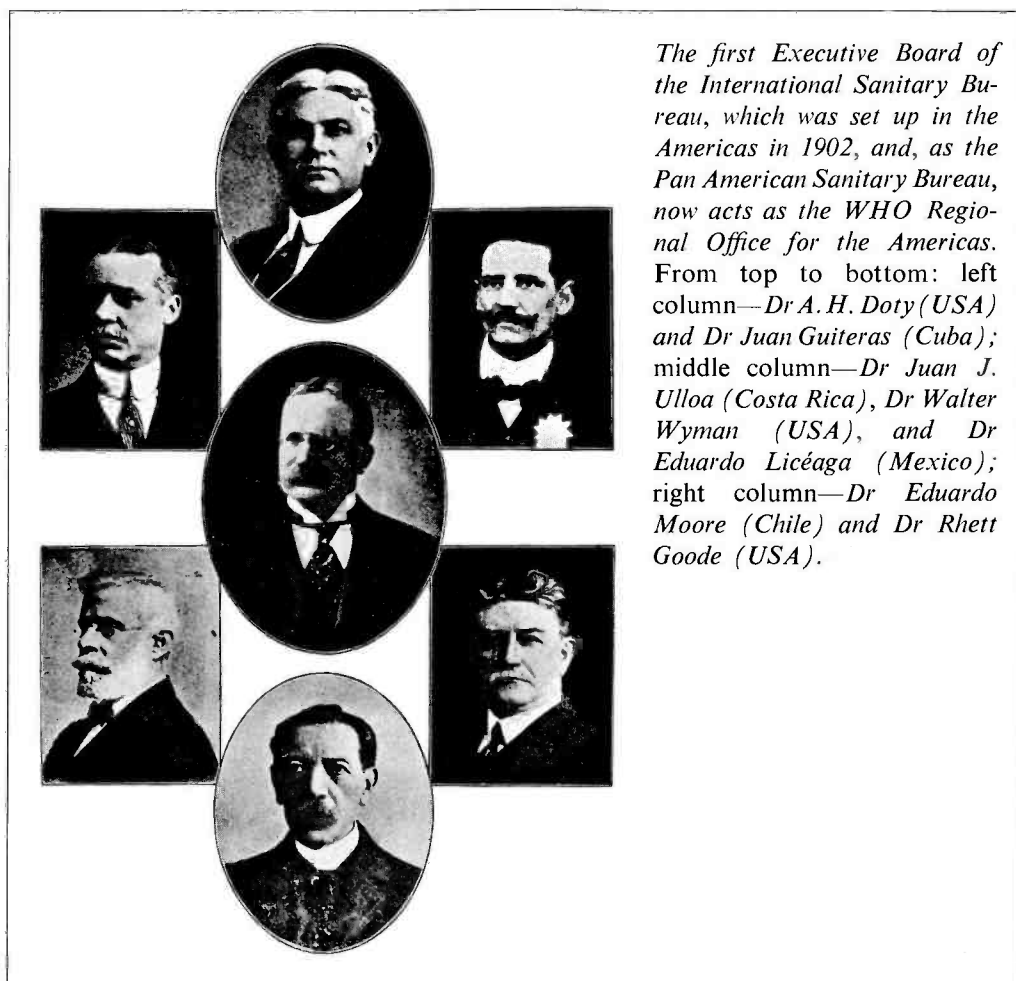
logical control measures were neglected following the mass campaigns.¹ The Organization therefore continues to concentrate on the reinforcement of surveillance, advising countries on the subject or assisting them with multipurpose seroepidemiological surveys that can eventually be integrated into the general health services. One of the consequences of the mass campaigns has been a change in the classical clinical picture of yaws in areas of low endemicity. Either patients do not present any clinical symptoms or the skin lesions are dry and hardly distinguishable from those of endemic or venereal syphilis.

1.84 During 1972, the WHO interregional treponematoses team started a multipurpose survey in two areas of Senegal where there appeared to be a risk of a recrudescence of infection. One is the Casamance area, where a mass campaign against yaws was carried out between 1958 and 1962, the proportion of clinical cases at the final examination being 1.4%. In 1970 and 1971, serological positivity rates in the region of 30% were recorded at the health centre of Bignona in Casamance and there were alleged cases of clinical yaws. The second area is the Senegal River basin, where mass treatment campaigns against endemic syphilis were undertaken between 1956 and 1965. A survey in this area in 1967 revealed a fairly high serological positivity rate (6-11%) and a 2.4% rate of active clinical cases among nomads. The present survey has been undertaken to estimate the real extent of the problem and investigate possible causes of the reported recrudescence of infection in the two areas. The reliability of the various serological procedures used for the detection of treponematoses will be examined, and the blood samples will also be used for prevalence studies of antibodies against trypanosomiasis, arbovirus infections and brucellosis, for genetic studies (haemoglobin types, immunoglobulin genetic markers) and for studies of the prevalence of viral hepatitis B antigen and α_1 -fetoprotein. Samples of food will also be examined for the presence of aflatoxin. Sampling in the Casamance area has been completed. Preliminary data show a serological positivity rate of 1-2% (for yaws) among children under 15 years of age, but clinical lesions have not been found.

1.85 With financial support from the Canadian Students' War against Yaws, a WHO-assisted survey for endemic treponematoses and other conditions of public health importance, including yellow fever and brucellosis, has been in progress in the Oudalan and Lobi regions of Upper Volta since the end of 1970.

¹ Guthe, T. et al. (1972) *Bull. Wld Hlth Org.*, 46, 1-14.

The photographic illustrations in this report reflect a few of the main themes in the World Health Organization's first 25 years. On this page appear some of the persons prominent in the establishment of WHO and of the forerunner of the Pan American Sanitary Bureau.



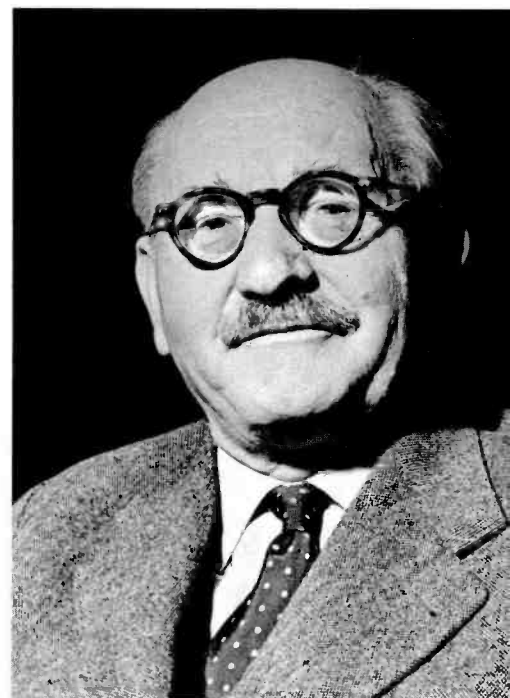
The first Executive Board of the International Sanitary Bureau, which was set up in the Americas in 1902, and, as the Pan American Sanitary Bureau, now acts as the WHO Regional Office for the Americas. From top to bottom: left column—Dr A. H. Doty (USA) and Dr Juan Guiteras (Cuba); middle column—Dr Juan J. Ulloa (Costa Rica), Dr Walter Wyman (USA), and Dr Eduardo Licéaga (Mexico); right column—Dr Eduardo Moore (Chile) and Dr Rhett Goode (USA).



Professor René Sand (Belgium), Chairman of the Technical Preparatory Committee, Paris, March-April 1946.



Dr Thomas Parran (USA), President of the International Health Conference, New York, June-July 1946.

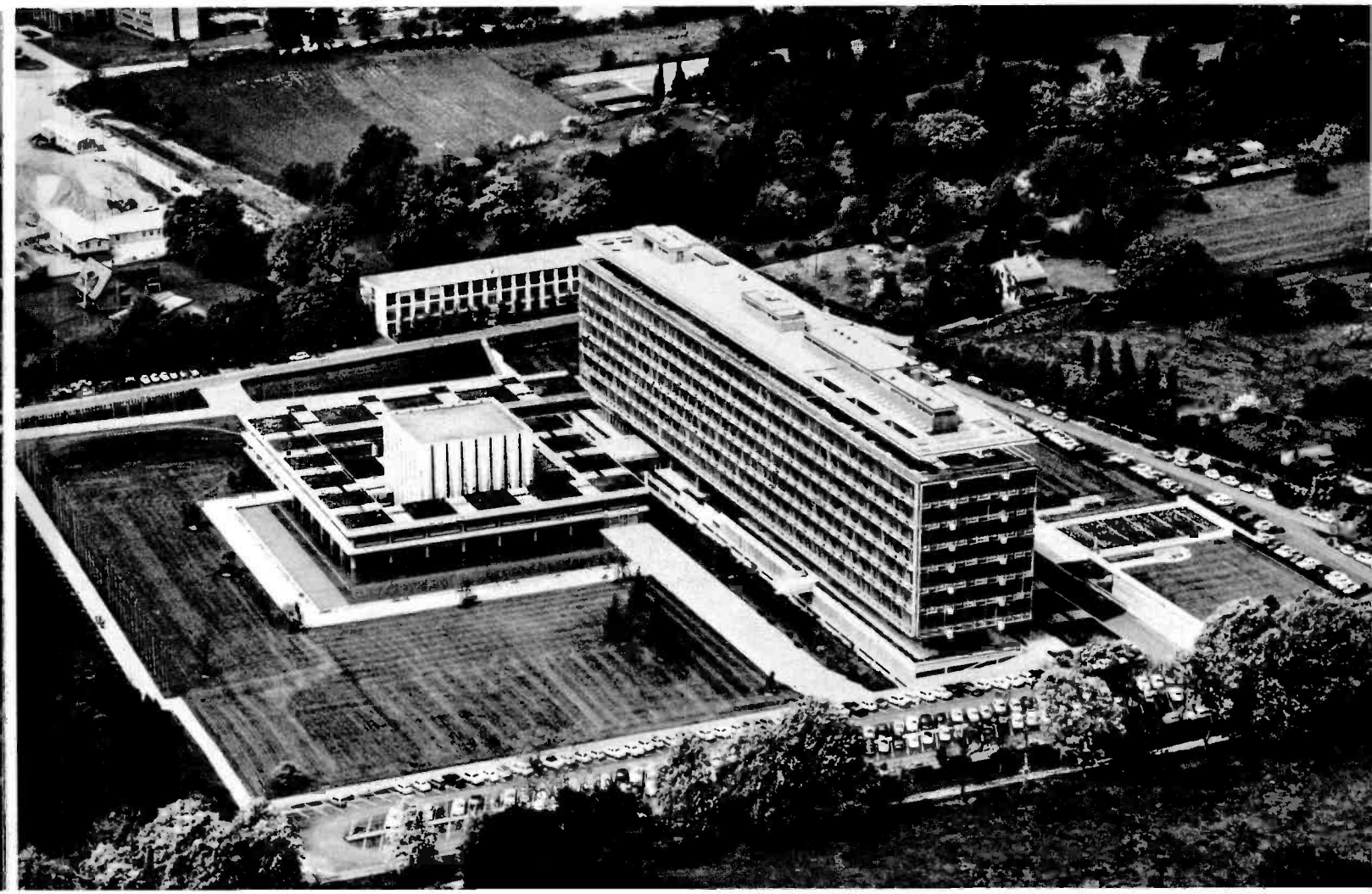
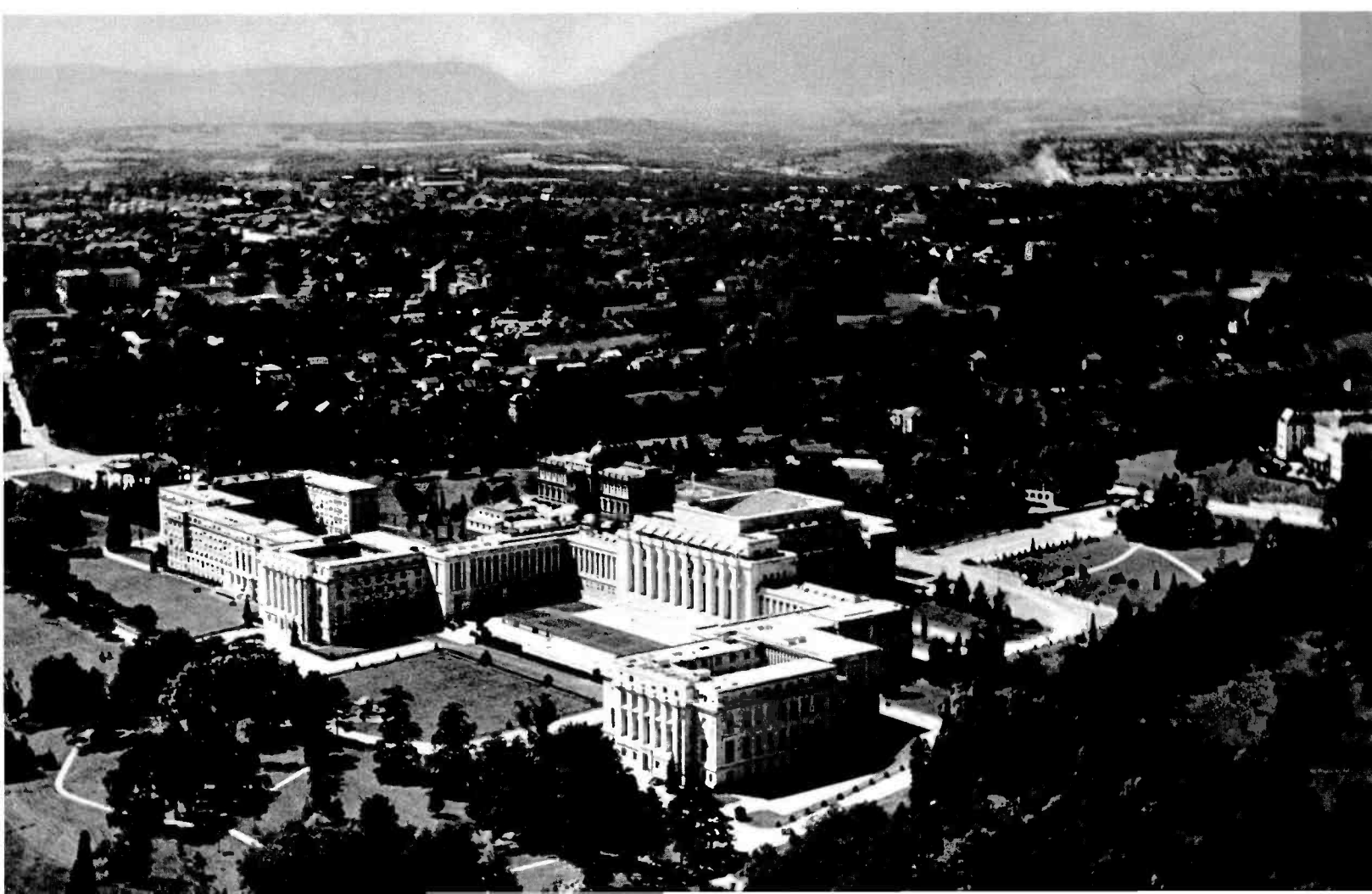


Professor Andrija Štampar (Yugoslavia), President of the First World Health Assembly, Geneva, June-July 1948.



At left: The first Director-General of WHO, Dr Brock Chisholm (left), was appointed by the First World Health Assembly in 1948. He was succeeded by Dr Marcolino G. Candau (right) in 1953.

Below: The Organization's first permanent headquarters were in the Palais des Nations in Geneva (left). In 1966 it moved to its present building (right).

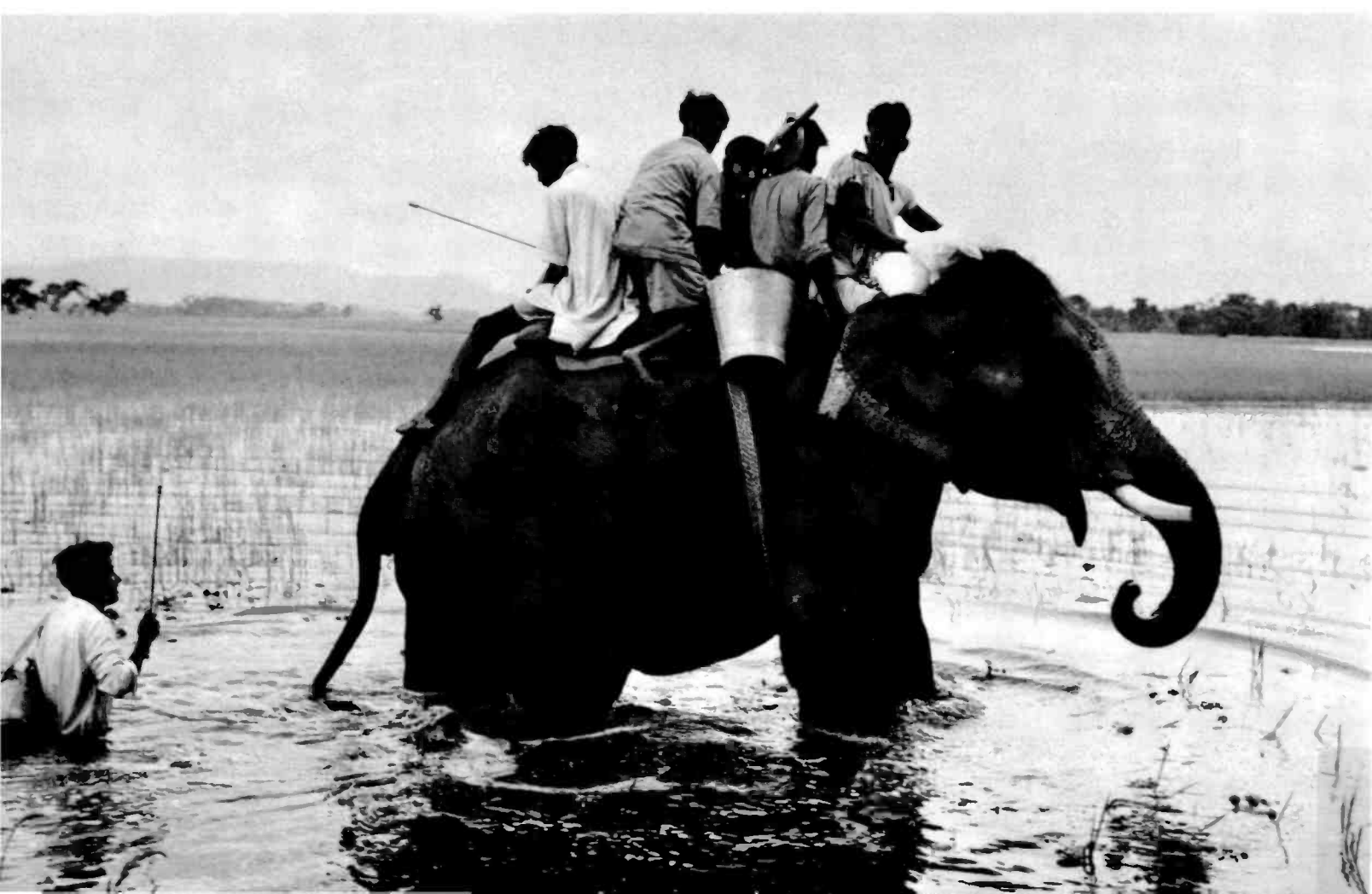


Malaria

From its earliest days, WHO has assisted in fighting malaria.

At right: Collecting mosquito larvae in a Nigerian river.

Below: A DDT spraying team in India moves from village to village on elephant back.



The results obtained in the Oudalan region were summarized in the Annual Report for 1971.¹ In the Lobi region, according to preliminary data, 1% of the children examined showed clinical symptoms of early infectious yaws and there was a positivity rate of 21% in serological tests for syphilis.

1.86 Despite the mass campaigns carried out over the past 20 years, important foci of endemic treponematoses remain, but it is impossible to estimate their extent in the absence of reliable data. In 1971, a report to WHO indicated a clinical prevalence of endemic syphilis of 1-2% in different areas of the Niger River valley in Mali; one-third of the population examined consisted of children under 14 years of age. A high serological positivity rate for the endemic treponematoses, unaccompanied by any clinical symptoms, was recorded in several African and other tropical countries in the same year. The WHO regional treponematoses team for Africa concluded a sero-epidemiological survey in Niger in 1972; preliminary data showed a serological reactivity rate of 5-40% among nomads at some sampling points. In the previous year, a VDRL positivity rate of 86% was recorded during a WHO-assisted genetic and serological survey among Pygmies in Zaire. In view of the high rate of false positive reactions in tropical countries, especially in Africa, further epidemiological, clinical and serological evaluation of these findings is needed.

1.87 The continued occurrence of sporadic infective cases of yaws in areas where mass treatment campaigns have been carried out is probably due to incomplete coverage during these campaigns. Other explanations have been advanced—for example, treponemal resistance to penicillin or the existence of an animal reservoir of infection—but they appear to have little foundation. *Treponema pertenue* is in fact as sensitive to penicillin as is *T. pallidum*, and there has been no record of any clinical relapse following treatment of yaws by an adequate single dose of a long-acting penicillin preparation. Infection from monkeys presenting clinical manifestations of yaws or harbouring *T. pertenue* has been suggested as a possible cause of recrudescences of the disease. That this is highly improbable is indicated by the negative results, reported in 1972, of a WHO-assisted investigation by the Department of Microbiology at the University of Dakar of the possibilities of transmission in a number of insects that might serve as vectors (*Anopheles gambiae*, *Aedes aegypti*, *Ae. luteocephalus* and the housefly).

1.88 Following the campaigns against the endemic treponematoses, an increased incidence of venereal syphilis is to be expected in the areas concerned since a new generation is growing up without cross-immunity to the disease. The risk is likely to be aggravated by social and economic factors. While the available data on syphilis incidence in areas where yaws was formerly endemic are in general unreliable, it may be noted that in 1971 the Organization for Coordination in the Control of Endemic Diseases in Central Africa reported a significant number of cases of venereal syphilis in Cameroon.

1.89 It is clear that, despite the excellent results obtained in mass treatment campaigns, the endemic treponematoses will remain a public health problem until the socioeconomic conditions of the populations concerned are sufficiently improved to eliminate the low-level transmission of yaws. Pending the integration of control and surveillance activities into the work of the basic health services, the WHO regional and interregional treponematoses teams continue to carry out multipurpose mass surveys and to pay special attention to the training of local epidemiological, clinical and laboratory personnel in surveillance methods.

Venereal diseases

1.90 Statistics on the incidence of gonorrhoea and syphilis depend directly on reporting by doctors, and their accuracy varies considerably from country to country. Thus, although long-term trends may be discerned, it is difficult to establish absolute incidence rates.

1.91 While the reported incidence of primary and secondary syphilis has risen markedly in most countries during the past ten years, there are signs of a levelling-out of the morbidity curve. Except in the United States of America, where there was an increase of 11.5%, the incidence rate in those countries from which data are available remained much the same in 1971 as in 1970. This levelling-out suggests that a balance is being struck in most countries between the medical and epidemiological measures taken against the disease and the social, behavioural and environmental factors encouraging its spread. However, although the incidence of syphilis—varying from 1 to 10 cases per 100 000 population—is generally much lower than that of gonorrhoea, in some countries it assumes epidemic proportions: in the USA in 1970, for example, syphilis came fourth in the list of communicable diseases, far exceeding hepatitis, rubella, measles or tuberculosis in incidence. In nearly all countries for which figures are available, a decline was

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.76.

recorded in 1971 in the number of cases of late symptomatic syphilis and of early congenital syphilis; this demonstrates the effectiveness of penicillin in the treatment of early syphilis and thus in the prevention of such serious developments.

1.92 There has been a significant recrudescence of gonorrhoea in recent years. Its incidence is now mounting steeply in practically all countries, creating an epidemic situation. The reported incidence is sometimes as much as 50 to 100 times (more usually, 10 to 30 times) greater than that of early syphilis, even though the reporting of gonorrhoea is probably considerably less complete than that of syphilis. According to official statistics, the gonorrhoea incidence per 100 000 population in 1971 was 307.5 in the USA and 158.7 in Canada—an increase of about 11% in each country during that year. High incidences were also reported from Denmark (316) and Sweden (about 500), where the statistics are particularly reliable. An increase in gonorrhoea incidence in 1971 was also reported in some eastern European countries and in those developing countries for which figures were available.

1.93 As reported at the Second International Venereal Diseases Symposium, held in St Louis, Mo., USA, in April 1972, complications of gonorrhoea, e.g., arthritis and salpingitis, are on the increase. In both sexes, some asymptomatic cases show mild septicaemic lesions. In Canada in 1971, about three times as many males as females in the middle and older age groups were infected with gonorrhoea, indicating the persistence of an asymptomatic reservoir of the disease in females. Improved bacteriological methods have revealed the existence of asymptomatic cases in males also.

1.94 Venereal disease rates, especially those for gonorrhoea, have continued to rise more steeply in the younger age groups than in the population as a whole. The fact that young women are maturing earlier is of some significance in this connexion. In the USA in 1971, 25.9% of gonorrhoea patients were under 20 years of age, the incidence rate for the age group 15-19 years being 808.6 per 100 000, as compared with 436.1 in 1966. The increased incidence of venereal diseases in the young is linked with changing behavioural patterns and social attitudes.

1.95 The incidence of venereal diseases in developed countries is higher in the cities; in the USA in 1971, it was twice as much as the national average in cities of more than 200 000 inhabitants. It may be noted that younger people form an increasingly large proportion of urban populations. The epidemiology of gonor-

rhoea in an urban setting, with particular reference to behavioural factors, is currently the subject of a WHO-supported study at the Hôpital Saint-Louis, Paris.

1.96 Increased population mobility is now recognized as an important factor in the spread of venereal diseases. For example, according to official statistics, 28% of syphilis cases and 14% of gonorrhoea cases in the United Kingdom in 1969 were imported. There is constant migration of workers within Europe, and more than 6 million European workers are now living away from their home countries. Furthermore, about 128 million tourist arrivals were recorded in the various European countries in 1970. The effect of these large-scale population movements on the spread of venereal diseases was discussed by a WHO working group that met in Copenhagen in December 1971. It was found that arrangements for intercountry notifications of cases detected in tourists and foreign workers, as a result of contact tracing, have been largely ineffectual, and the group concluded that control measures at the national level remain the best means of limiting the international spread of venereal diseases.

1.97 It has been suggested that the decreasing sensitivity of gonococci to penicillin is a major cause of the present gonorrhoea epidemics, but, according to studies carried out at the WHO International Reference Centre for Gonococci, *Neisseria* Department, Statens Seruminstitut, Copenhagen, this factor does not seem to play a significant part in the spread of the disease in the developed countries. While it is undoubtedly true that strains of gonococci with reduced sensitivity to penicillin have appeared all over the world, reduced sensitivity was found in only 31.2% of Danish strains examined at the Centre in 1971 (virtually the same proportion as in the preceding three years). On the other hand, practically all the strains shipped to the Centre from the WHO Western Pacific Region were less sensitive. In the above-mentioned study at the Hôpital Saint-Louis, Paris, it was found that, throughout the period 1961-70, a single injection of 3 million IU of medium long-acting penicillin was usually sufficient to cure the disease; in the Western Pacific Region, however, according to data presented at a WHO regional symposium on venereal diseases held in Bangkok in December 1971, doses of up to 4.8 million IU fail to cure 30% of male patients.

1.98 Under the Brussels Agreement of 1924 respecting facilities to be given to merchant seamen for the treatment of venereal diseases, WHO is responsible for the preparation and publication of a list of venereal disease treatment centres in various ports throughout

the world. During 1972, the Organization published the third edition of the *World Directory of Venereal-Disease Treatment Centres at Ports*.¹ It includes the seventh list of treatment centres (superseding that published in 1961) and includes information received by the Organization up to 22 September 1971.

Research

1.99 *Gonorrhoea*. Gonococci are difficult to detect in asymptomatic cases, especially in females. There is therefore a growing demand for special media to ensure the survival of gonococci isolated from suspect cases during the transport of samples to laboratories for diagnostic tests. The WHO International Reference Centre for Gonococci, in Copenhagen, has investigated the effectiveness of a frequently used selective culture medium containing vancomycin, polymyxin B and nystatin, but an examination of gonococcal strains grown on the medium in a particular month showed that 7% of them were sensitive to vancomycin.

1.100 One of the major aims of gonorrhoea research is to find methods of serological diagnosis that will also facilitate studies of immune mechanisms in gonorrhoea. According to data presented at a seminar on *Neisseria gonorrhoeae*, which was held on the occasion of the Annual Meeting of the American Society of Microbiology in April 1972 and at which WHO was represented, the sensitivity rates for the various serological procedures using somatic antigens of gonococci range from 80% to 88%, the results being non-specific in 4-18% of cases.

1.101 A line of research that may lead to more specific methods is being encouraged by WHO. It has been found independently by several research workers that the surfaces of pathogenic colonial variants of gonococci (types I and II) are covered with pili. During 1972, the Department of Microbiology, Rockefeller University, New York, USA, showed that these pili have a helical structure and consist of protein without a DNA or RNA core. The results of a radio-immune assay performed with an antigen isolated from the pili of gonococci showed a very good correlation with clinical diagnoses.

1.102 The WHO International Reference Centre for Gonococci, Copenhagen, has continued to identify problem strains received from different countries and to examine gonococci isolated from throat swabs and cultures of meningococci from rectal sites. It has now been found that only the fermentation technique

should be used, as immunofluorescence with absorbed immune serum or with the inhibition procedure is unreliable.

1.103 The Centre has also continued its systematic studies on the sensitivity of gonococci from different parts of the world to the sulfonamides and antibiotics commonly used in treatment as well as to new antibiotics. Similar studies are being carried out, with WHO support, at the Venereal Diseases Reference Laboratory of the London Hospital Research Laboratories and at several institutes in Paris. *In vitro* studies at the Copenhagen Centre have shown that the penicillin sensitivity of gonococcal strains isolated in Denmark has changed only slightly during the past few years (see paragraph 1.97). Resistance to streptomycin, on the other hand, was found in 24.6% of strains in 1971 as compared with 20.3% in 1968. There has been little variation in the activity of tetracycline.

1.104 *Treponematoses*. The modifications produced in syphilis antibodies as a result of changes in atmospheric conditions during the storage, distribution, or mailing of serum specimens could have a certain influence on the results of serological tests. In an investigation of yaws in Northern Nigeria carried out by a WHO team in 1965-66, it was found that there was no loss of positivity in specimens preserved in liquid nitrogen containers or protected by wet ice. The proportion of seroreactions with the *Treponema pallidum* immobilization (TPI) and Venereal Disease Reference Laboratory (VDRL) tests was substantially lower for unprotected aliquots, and serum samples preserved in liquid nitrogen tended to give higher titres. The freezing and thawing of sera for the fluorescent treponemal antibody (FTA) test and the FTA titres of IgM immunoglobulins were studied in 1972 by the WHO International Treponematoses Laboratory Centre, Johns Hopkins University, Baltimore, Md., USA. In another study, carried out with WHO support at the State Bacteriological Laboratory, Stockholm, it was found that, when sera were heated, the decrease in titre was considerably greater in the TPI test than in the FTA test, owing to the vulnerability of the complement-fixing Fc fragment of immunoglobulins.

1.105 A number of other WHO-supported studies relating to diagnostic tests for syphilis were carried out during the year. At the Institut Pasteur, Paris, a more stable lecithin ether replacing the ester was successfully used for the preparation of cardiolipin antigen emulsion. A chemically well defined medium ensuring the survival of treponemes was developed at

¹ World Health Organization (1972) *World directory of venereal-disease treatment centres at ports*, 3rd ed., Geneva.

the Department of Dermatology, Baylor University College, Houston, Texas, USA, with a view to improving the comparability of TPI tests performed at different laboratories. At the Venereal Diseases Reference Laboratory, London, an FTA-inhibition test was compared with the FTA-absorption (FTA-ABS) and TPI procedures and found almost as useful. A system of marking antihuman globulins with peroxidase was developed in the Institute of Hygiene, Medical Faculty, Lyons, France; this should obviate the need for complicated immunofluorescent procedures and equipment in certain tests. The Venereal Diseases Reference Laboratory, London, has also prepared a conjugate for the detection of *T. pallidum* in smears with the aid of immunofluorescence; this method has been shown to be almost as useful as darkfield examination and has facilitated the bacteriological examination of mailed smears.

1.106 The WHO International Treponematoses Laboratory Centre, Baltimore, continued to maintain collections of pathogenic and non-pathogenic treponemal strains in liquid nitrogen and carried out studies on the conditions favouring the preservation of treponemes in a deep-frozen state. The WHO International Reference Centre for the Serology of Treponematoses, Center for Disease Control, Atlanta, Ga., USA, carried out proficiency tests for laboratories in the Region of the Americas and the South-East Asia and Western Pacific Regions. It also tested the quality of commercial reagents used for the serological diagnosis of syphilis and circulated a list of the most suitable. In addition, it developed procedures for the automation of the *Treponema pallidum* haemagglutination (TPHA) and FTA tests and coordinated comparative studies in different laboratories with the aim of achieving greater comparability in FTA-ABS and TPI testing.

1.107 Studies of the spiral organisms found in previously treated syphilis patients with persistent positivity and in treated syphilitic rabbits have been sponsored by WHO at a number of institutes: the Venereal Diseases Reference Laboratory, London; the Central Institute for Research on Skin and Venereal Diseases, Moscow; and the WHO International Reference Centre for Endemic Treponematoses, Institut Albert-Fournier, Paris. There is still much controversy concerning the nature, significance and pathogenicity of these organisms. That treponemes cannot be made penicillin-resistant has been confirmed at the International Reference Centre in Paris, where attempts to reduce treponemal sensitivity to penicillin in rabbits treated by subcurative doses were unsuccessful.

1.108 In view of the low concentration of penicillin in the cells of host animals after treatment with this antibiotic, electron microscope studies of intracellular treponemes in syphilitic chancres in rabbits are being carried out at the above-mentioned institute in Moscow with WHO support.

1.109 The Organization has continued to support research on immunization against syphilis. At the State Bacteriological Laboratory, Stockholm, natural immobilizing antibodies in the IgM class of immunoglobulin were found and their relationship with specific antibodies was studied. The immunization of rabbits with various non-viable treponemal antigens—gamma-irradiated or killed by refrigerator storage—was continued at the Department of Microbiology, University of California, Los Angeles, USA, and at the Ludwik Hirsfeld Institute, Wrocław, Poland. Various shortened schedules for the immunization and preservation of treponemes in the deep-frozen state were used with success. It was found, however, that immunized rabbits develop antibodies against homologous tissues. As it has still proved impossible to cultivate pathogenic treponemes *in vitro*,¹ vaccines have been prepared from infected rabbit testicles, but it is much too early to consider the use of such vaccines in man. Attempts are being made at the University of California, Los Angeles, to produce purified treponemal suspensions by means of density gradient centrifugation. In the Institute of Hygiene, Palermo, Italy, separation procedures were developed to identify the cell-wall component responsible for immobilization, with a view to eliciting the formation of protective antibodies.

1.110 Another experimental approach to immunization is through the use in chimpanzee models of *T. carateum*, the causative agent of pinta, which produces only pigment disorders in man. The results are not so encouraging as those of earlier trials in humans; on superinfection with *T. pallidum*, the pinta-infected chimpanzees reacted with chancres.

1.111 In accordance with the recommendations of a WHO Scientific Group on Treponematoses Research that met in 1969,¹ several institutes are studying the mechanism of immunity in syphilis. During 1972, it was shown in a WHO-assisted study at the Institute of Hygiene, Medical Faculty, Lyons, that circulating antibodies play some protective role in rabbits. Cell-mediated immunity studies using various methods were carried out at the Institute of Hygiene, Palermo, and other institutes, with WHO support.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 455, pp. 66-68.

Tuberculosis

1.112 The magnitude and public health importance of the tuberculosis problem in the developing countries are demonstrated by a recent analysis of data from the South-East Asia Region. It was estimated by WHO that, of the total population of approximately 750 million in this Region, about 3 million are suffering from such advanced forms of the disease that they are highly infectious to their contacts. Nor has tuberculosis ceased to be a problem in the technologically more advanced countries; each year the numbers of new cases reported and of deaths due to this disease are considerable, even in countries that have reached a high level of socioeconomic development.

1.113 WHO's assistance to Member States in their efforts to control tuberculosis continued through long-term country projects, the provision of advisory services, and assistance with national, regional and interregional training efforts. The Organization also supported research in various fields of tuberculosis control and distributed the latest technical information.

1.114 BCG vaccination programmes—generally acknowledged to be a reliable means of controlling tuberculosis—are now in operation in most countries of the world, the majority of the programmes being assisted by WHO and usually by UNICEF also. In the Western Pacific Region some 12 million children were vaccinated during 1972, and in countries where vaccination is part of the national tuberculosis control programme the coverage of the susceptible population (generally speaking, from preschool age to adolescence) was high enough to make an epidemiological impact in the years to come. High priority is also being given to BCG vaccination in countries of the African Region. During 1972, 25 WHO-assisted BCG vaccination programmes were in operation; the majority were combined with smallpox vaccination campaigns and achieved a high coverage of the susceptible population. Such combined campaigns have become possible since the adoption of the practice of direct BCG vaccination (without prior tuberculin testing), which can be carried out in one operation, and since it has been shown that simultaneous BCG and smallpox vaccination is both harmless and effective.

1.115 Although under the experimental conditions of controlled clinical trials—many of which have been supported or coordinated by WHO—tuberculosis has been shown to be practically always curable, chemotherapy has not been producing the theoretically feasible cure rates, particularly in the South-East Asia and Western Pacific Regions. This is largely due to

the lack of services to provide the necessary supervision and guidance to ensure that patients follow their treatment regularly. Diagnostic services are likewise often inadequate. It is clear that tuberculosis control must cease to be the prerogative of a few specialized institutions and become an accepted responsibility of general health services, including hospital outpatient departments and general practitioners. This is now possible, thanks to the standardization and simplification of control measures so that they can be safely implemented by non-specialized health workers. The decentralization of a service hitherto regarded as a specialized sphere has thus been increasingly widely accepted, and tuberculosis control is gradually being integrated into the general health services. This trend is particularly marked in the Regions of Africa, the Americas and the Western Pacific, where more and more comprehensive projects for the development of epidemiological or health services are embracing tuberculosis control.

1.116 However, the implementation of tuberculosis programmes as an integral part of the general health services would be impossible without the requisite health infrastructure and manpower. The Organization therefore continued to lay particular emphasis on training and provided assistance in this field to a number of countries. In the South-East Asia Region the National Tuberculosis Institute at Bangalore continued to train tuberculosis control workers from neighbouring countries as well as personnel for the Indian national control programme, and regional courses and seminars were held in the Regions of the Americas, Europe and Western Pacific. The interest shown by governments in the international courses on the epidemiology and control of tuberculosis does not seem to wane, despite the fact that more than 260 experts have attended these annual courses since they were started in 1962. This not only reflects the awareness of the need for a systematic and comprehensive approach to tuberculosis control, but is also an indication of the lack of adequately trained personnel in many countries—particularly with regard to the managerial sciences, the application of mathematical techniques to epidemiology, and programme planning and evaluation. Further details about WHO-assisted training with regard to tuberculosis control are given in Chapter 10.

1.117 Close cooperation was maintained with the International Union against Tuberculosis. The Organization continued to assist the Union's Tuberculosis Surveillance Research Unit and was represented at meetings of the Union's scientific committees, Executive Committee and Council.

Research

1.118 As mentioned above, lack of adequate supervision and patients' attitudes usually make it impossible to achieve under field conditions the level of success that can be attained in a controlled clinical trial. Regimens that are more acceptable both to the patients and to the personnel administering them would help to improve the situation. As was shown in the Annual Report for 1971,¹ good progress has already been made—for instance, in demonstrating the efficacy of controlled ambulatory chemotherapy and of intermittent twice-weekly drug treatment, which allows for better supervision. WHO-assisted studies were continued in 1972 to assess the possibility of achieving further operational convenience, without loss of therapeutic efficacy, by shortening the duration of both the initial intensive phase and the total course of treatment, and by increasing the intervals between drug administration. However, the possibilities of adopting the latter approach are limited by the number of rapid inactivators of isoniazid; a once-weekly regimen for such patients, for example, would not be practicable with the usual isoniazid preparation. Controlled trials of a slow-release isoniazid preparation are therefore being carried out by the Tuberculosis Chemotherapy Centre (Madras, India) and the Second Tuberculosis Clinic of Charles University, Prague, in collaboration with the Medical Research Council of the United Kingdom. The therapeutic efficacy of this preparation in rapid inactivators of isoniazid and its toxicity in slow inactivators are being investigated, and simplified and standardized methods are being established to identify the two genotypes.

1.119 With regard to shortening the duration of treatment, several six-month regimens, including the use of rifampicin in combination with isoniazid and streptomycin, are being studied by the East Africa Tuberculosis Investigation Centre, Nairobi. Not only is rifampicin highly effective in rendering newly detected and previously untreated patients sputum-negative, but it also appears to give similarly favourable results when applied to patients who have failed to respond to standard treatment. If this is confirmed by controlled trials now in progress—one of them being carried out with WHO assistance in Poland by the National Research Institute for Tuberculosis—the considerable epidemiological and social problem posed by drug-resistant chronic cases would become amenable to successful management.

1.120 Attempts during the past two decades to develop a killed vaccine by antigen fractionation or a

BCG vaccine that [would provide immunity without concomitantly inducing tuberculin sensitivity have met with little success and support for such studies has been discontinued, especially since recent research on cell-mediated immunity has indicated that acquired resistance is closely related to delayed hypersensitivity and the immune response is much more easily stimulated by living bacilli than by dead material. Attention is rather being concentrated on potency assays of live vaccines in animals and on the production of fractionated antigens that would allow infections by different mycobacterial species to be clearly differentiated, either by skin tests or serologically. WHO-supported studies on such specific fractions are being carried out at the Institute of Hygiene and Epidemiology, Prague, in collaboration with the University of Göteborg, Sweden, and George Washington University in the USA.

1.121 Although it is now widely recognized that simultaneous immunization against several communicable diseases can be carried out without risk of complications or mutual suppression of immunogenic effects, the intradermal injection technique—which is recommended for BCG in view of the importance of precise dosage—may be an obstacle to the inclusion of BCG in combined vaccination programmes. So far, comparisons between the recommended intradermal technique and techniques believed to be simpler and operationally more efficient (such as multiple puncture and scarification) have only confirmed the superiority of intradermal vaccination for BCG. However, WHO has assisted research on two techniques used for smallpox vaccination, the jet-gun and the bifurcated needle. The former has been shown to be not much inferior to intradermal vaccination by syringe and needle, although it is doubtful whether it is always operationally simpler. Preliminary results of current studies on the bifurcated needle are encouraging, provided a highly concentrated percutaneous BCG vaccine is used. However, it remains to be seen whether it is possible to obtain consistently satisfactory results when the bifurcated needle technique is used for BCG by the routine smallpox vaccinator in the field.

1.122 In the WHO-assisted tuberculosis prevention trial with BCG started in India in 1968, the whole population of the trial area near Madras (some 400 000) has now undergone initial examination. During 1972, in addition to continuous selective case-finding, work was started on the first systematic re-examination of those who were examined 2½ years previously, on entering the trial. A data-processing system was developed and is being used for a preliminary analysis of the data collected so far. Efforts are now being made to find a suitable control popu-

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.107.

lation that has little or no sensitization to atypical mycobacteria. To this end, demographic and epidemiological data are being collected in certain areas where the population has never been exposed to mass BCG vaccination, in the northern hills of India and in Sardinia, Italy (with the cooperation of the University of Sassari), in order to ascertain whether the prevalence of tuberculosis is high enough to justify a similar trial being carried out.

1.123 The WHO International Reference Centre for BCG Seed Lots and Control of BCG Products, in Copenhagen, together with collaborating laboratories, carried out *in vitro* and *in vivo* assays of BCG vaccines, in particular those supplied for UNICEF/WHO-assisted tuberculosis control projects. In this connexion, 11 BCG vaccines used to vaccinate school-children in 1965 and 1966 were assessed by means of tuberculin sensitivity tests. It was found that the results obtained five years later were very similar, within each test group, to those obtained almost immediately after vaccination. On the other hand, the considerable variation in individual reactions indicated that postvaccination testing of an individual's tuberculin sensitivity is not a valid means of determining whether or not revaccination is necessary.

1.124 A study that may be expected to affect decisions as to whether and when to revaccinate with BCG was published during the year by a group with which WHO enjoys close research collaboration.¹ In a controlled trial in the United Kingdom involving more than 50 000 children followed up for 15 years, it was shown that BCG vaccination conferred 80% protection during the first 5 years; the efficacy then decreased gradually but was still nearly 60% between 10 and 15 years after vaccination, and it extended to all forms of tuberculosis—including tuberculous meningitis and miliary pulmonary tuberculosis.

1.125 The International Tuberculosis Surveillance Centre was established in 1971² under the joint sponsorship of the International Union against Tuberculosis, the Organization for Health Research in the Netherlands, and WHO, to assess the extent and trend of the tuberculosis problem in order to establish a rational basis for planning and evaluating national control efforts. In its first year of operation it has carried out or assisted in tuberculin testing in the Federal Republic of Germany, Indonesia, Italy (in connexion with the study in Sardinia mentioned in paragraph 1.122), Morocco, the Netherlands

including Surinam, Turkey, Uganda, and Zaire. Altogether, 16 governments have so far indicated their wish to avail themselves of the services of the Centre.

Leprosy

1.126 In the absence of a specific vaccine and of a diagnostic skin test, leprosy control can at present be based only on secondary prevention. Though effective, the principal antileprosy drug—dapsone—is slow-acting and has to be administered regularly over long periods. This means that facilities for case-finding and treatment must be organized on a long-term basis—in many countries, with sustained international assistance. Despite these drawbacks, reports from countries with properly operated control programmes suggest that the incidence of secondary cases may be appreciably reduced. For instance, the WHO-assisted programme in Burma—where there are over 220 000 registered cases—has made remarkable progress, notably as regards case-finding and regularity of treatment. In some African countries the case-load is being reduced, since the number of cases released from control now exceeds the number of newly detected cases.

1.127 WHO-assisted evaluations of control programmes are in progress in various countries, notably in South-East Asia. In accordance with the recommendations of a WHO Expert Committee on Leprosy,³ several countries in Africa, Asia and South America are gradually integrating their leprosy control services into the basic health services. Such action, however, should not be taken too hastily. In particular, the cost/effectiveness ratio must be carefully studied: there is little point in maintaining costly institutions that benefit only a very small proportion of patients yet may take up as much as 80% of the leprosy budget, leaving a small margin for control work.

1.128 During 1972, WHO continued to give technical guidance to leprosy control programmes assisted by UNICEF and by voluntary organizations. As in previous years, the WHO Special Account for the Leprosy Programme received valuable contributions for control or research projects from various agencies, including Emmaüs-Suisse (Aide aux Lépreux), the Order of Malta (Comité international de l'Ordre de Malte pour l'Assistance aux Lépreux), Deutsches Auswärtiges Hilfswerk (Federal Republic of Germany), and the Lepers' Trust Board Inc. (New Zealand). Cooperation between WHO and the European Federation of Anti-leprosy Associations was strengthened.

¹ Medical Research Council, Tuberculosis Vaccines Clinical Trials Subcommittee (1972) *Bull. Wld Hlth Org.*, 46, 371-385.

² See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.110.

³ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 459, p. 14.

1.129 In the African Region, where the estimated number of leprosy cases is more than 3 million, WHO assistance to leprosy control in several countries is now provided within the framework of epidemiological advisory services dealing with the principal communicable diseases.

1.130 In the Region of the Americas, the Organization assisted the Central American countries and Cuba in rehabilitation programmes in which special emphasis was placed on the prevention of disabilities due to leprosy. Countries were helped in assessing the extent of the leprosy problem, in planning, organizing and evaluating control programmes, in integrating these programmes into the work of the general health services, and in training personnel. Assistance was given to the National Institute of Dermatology, Caracas, and the Pan American Zoonoses Centre, Buenos Aires, for the establishment of animal models for leprosy research.

1.131 In the South-East Asia Region, WHO continued to advise and assist several countries—notably Burma, Nepal, Sri Lanka and Thailand—in leprosy control. An evaluation of the programme in Burma was started and will continue into 1973. In Khon Kaen Province, Thailand, an assessment was made of epidemiological trends and the progress of leprosy control since a WHO team carried out a leprosy survey in the area in 1962. In all countries of the Region, the gradual integration of leprosy control services into the general health services is under way.

1.132 Leprosy remains a public health problem in a few countries on the periphery of the European Region. Individual importations of the disease, mainly in connexion with the free labour market inside the European Economic Community and immigration from tropical areas, have been observed in some western European countries.

1.133 In the Eastern Mediterranean Region, leprosy continues to be of special concern in Ethiopia and Sudan. The Organization gave advice to the latter country on the renewal of leprosy control work in the southern provinces, on the intensification of anti-leprosy activities in other areas of high prevalence, and on the establishment of a pilot control area.

1.134 In the Western Pacific Region, WHO is evaluating the leprosy situation and treatment needs in the British Solomon Islands Protectorate, at the request of the Government. Advisory services were provided to the Republic of Korea. UNICEF continued to supply drugs for the leprosy projects in the

Philippines, the Republic of Korea and the Republic of Viet-Nam. In some countries of the Region, case-finding is hampered by inadequate planning and inattention to epidemiological factors and to operational efficiency.

Research

1.135 In 1972, 41 institutes in 23 countries cooperated with the Organization in 56 projects. Twenty-nine papers dealing with WHO-assisted research in leprosy were published in the *Bulletin of the World Health Organization* and other journals during the year. Some of the WHO-supported research activities are described below.

1.136 In operational research, WHO is assisting the Ministry of Health of Burma in studies on ways of integrating the leprosy control service into the general health services, and related trials are in progress in several districts. Progress in the past 5-10 years will be compared with that anticipated during and after integration, and the cost/effectiveness of both types of leprosy service—specialized and integrated—will be assessed.

1.137 In the epidemiological field, the Organization is cooperating with the Department of Epidemiology, School of Public Health, Catholic University of Louvain, in Belgium, which is investigating an epidemiological model for leprosy and methods of collecting statistical and administrative data for the assessment of leprosy control programmes. Pedigree data on families with a history of leprosy extending over several generations have been collected by the Philippines branch of the Institute for Cancer Research, Philadelphia, Pa., USA. This material will be examined from the genetic standpoint.

1.138 In the WHO Regional Reference Centre for *Mycobacterium leprae*, National Institute for Medical Research, London, the existence of dapsone resistance has been fully established. It takes at least 6 years to emerge, the peak of emergence occurring after 12 years of treatment. Preliminary estimates of its frequency range from 1 to at least 4 cases per 1000 patients under treatment, but the exact frequency will probably be difficult to establish. Results of a controlled trial carried out in Malaysia by the Centre suggest that rifampicin is highly effective in the treatment of both previously untreated and dapsone-resistant lepromatous patients. The capacity of rifampicin to kill *Myco. leprae* persisting in nerves and muscles long after its elimination from the skin by dapsone treatment is also being investigated.

1.139 At the WHO Regional Reference Centre for *Mycobacterium leprae*, Center for Disease Control, Atlanta, Ga., USA, strains of *Myco. leprae* isolated from 58 patients in different parts of the world were tested in mice for resistance to dapsone. Resistant isolates were found in 21 treated patients. The time elapsing from the start of treatment until dapsone resistance became apparent was usually 8-15 years. No resistant strains have yet been isolated from previously untreated patients.

1.140 During the year, five research centres—in India, Mali, Senegal, Somalia and Venezuela—began collaborative, long-term, controlled trials of leprosy treatment with acedapsone and with a combination of clofazimine and dapsone.

1.141 WHO-assisted studies on the cultivation and experimental transmission of *Myco. leprae* have continued. Further progress has been made in attempts to cultivate *Myco. leprae* in cell-free media, notably at the Department of Tuberculosis, National Institute of Health, Tokyo, where a semisynthetic soft agar medium is being used. Following changes in the base composition of the medium (notably the addition of pyruvate), bacterial masses of 200-300 μ were observed after 50 weeks' incubation. Third subcultures appear to have been successful. Immunological and electron microscope identification tests were carried out on the bacteria cultivated. In a similar study at the Institute of Hygiene and Epidemiology, Prague, a slight but definite multiplication of *Myco. leprae* was observed in subsurface layers of the medium and mycelium acid-fast structures without cord formation could be detected.

1.142 At the Leprosy Research Department of the Research Institute for Tuberculosis and Leprosy, Tohoku University, Sendai, Japan, attempts were made to cultivate *Myco. leprae* and *Myco. lepraemurium* (Hawaiian strain) on a basic medium to which a new protease inhibitor, leupeptin, had been added. After a period of 2-3 months, during which the culture tubes were shaken twice a day, bacterial clumps of different sizes were observed in the case of *Myco. leprae* and there was an abundant growth of *Myco. lepraemurium*. At the Department of Bacteriology, Hebrew University-Hadassah Medical School, Jerusalem, repeated *Myco. leprae* counts were made in media supplemented with 70% ethanol extract and a sonic extract of *Myco. smegmatis*; agar at a concentration of 0.5% was usually inhibitory but lower concentrations promoted growth. Dimethylsulfoxide at concentrations of 2.5% and 5% enhanced the multiplication of *Myco. leprae* in liquid media and in all agar concentrations tested.

1.143 The possibility cannot be excluded that there is a life cycle of *Myco. leprae*, of which the well-known form with its distinctive properties constitutes only a phase. Work at the Microbiology Laboratory, Faculty of Science, University of Dakar, suggests the existence of such a cycle, certain phases of which may be cultivable and pathogenic for mice. At the Department of Leprosy, Central Institute for Research on Skin and Venereal Diseases, Moscow, the complex development cycle of *Myco. lepraemurium*, of which non-acid-fast forms are apparently one stage, has been further investigated.

1.144 Studies have continued at the Johns Hopkins University-Leonard Wood Memorial Leprosy Research Laboratory, Baltimore, Md., USA, on the use of adenosine-triphosphate (ATP) as an indicator of growth potential in small numbers of cells of *Myco. leprae* and *Myco. lepraemurium*. The ATP criterion has been refined to a degree permitting the evaluation of claims of limited microscopic growth. A study was carried out to ascertain whether microscopic counts and ATP determination would substantiate earlier reports on the growth of *Myco. lepraemurium* on silicon-coated slides. It was concluded that ATP determinations can distinguish genuine from spurious microscopic growths of non-cultivated mycobacteria.

1.145 Investigations to find suitable host cells for *Myco. leprae* are also in progress. At the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md., USA, leprosy bacilli were inoculated into macrophages from thymectomized irradiated mice. Cultures were maintained at 37°C and 30°C, the periods of observation ranging from a few weeks to 10 months. In most instances, degeneration of the organisms was observed. However, some of the cultures kept at 30°C showed a definite increase of bacteria and could be maintained for as much as 152 days; subcultures have been made.

1.146 Several institutes are cooperating with WHO in studies involving animal transmission. The established model, i.e., mouse footpad inoculation, continues to be used at the WHO Regional Reference Centre for *Mycobacterium leprae*, London, for studying the pathogenesis of leprosy with particular emphasis on peripheral neuritis. This model is also used by the Centre for quantitative studies on *Myco. leprae* excreted from the upper respiratory tract of patients with active lepromatous leprosy. Inoculated into mice, these bacilli have all the characteristics of *Myco. leprae* obtained from skin lesions.

1.147 At the Department of Bacteriology, Hiroshima University School of Medicine, Japan, antileprosy

drug regimens using rifampicin, dapsone, streptomycin and kanamycin, singly and in various combinations, were tested against *Myco. leprae* in over 300 female mice. The results with rifampicin and dapsone were encouraging.

1.148 Studies at the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md., USA, have shown up to 450-fold variations in the growth of *Myco. leprae* in a group of 24 CBA mice. The investigators believe that their findings cast some doubt on the reliability of the mouse footpad method for the experimental evaluation of preventive and curative measures.

1.149 In long-term studies at the Department of Leprosy, Central Institute for Research on Skin and Venereal Diseases, Moscow, the administration of antibiotic immunodepressants (bruneomycin, olivomycin) to mice failed to promote the growth of *Myco. leprae*. The use of adrenalectomized mice and rats did not seem to offer any particular advantage. The long-term administration of antilymphocytic serum appeared to enhance the multiplication of *Myco. leprae* in the mouse footpad after a period of 6 months or more.

1.150 Attempts have been made to find more animal species that are sensitive to *Myco. leprae*. At the Institute of Leprology, Rio de Janeiro, Brazil, the preliminary results with some species of South American rodents were disappointing. The Mongolian gerbil (*Meriones* sp.) was tested by means of footpad inoculation at the National Institute for Leprosy Research, Tokyo; no evidence of bacterial growth was observed with isolates of *Myco. leprae* from lepromatous patients or from mouse passages. In the Department of Bacteriology, Hiroshima University School of Medicine, Japan, similar trials have been carried out with Japanese newts (*Triturus* sp.).

1.151 The suitability of the nine-banded armadillo (*Dasypus novemcinctus*) as an animal model for leprosy transmission was recently tested, with promising results, at the Laboratory Research Branch, Public Health Service Hospital, Carville, La., USA, and the Department of Biochemistry, Gulf South Research Institute, New Iberia, La., USA. In cooperation with these institutes, WHO is promoting the use of this animal model in different parts of the world.

1.152 Recent advances in the field of immunology have contributed to the development of WHO-assisted leprosy research projects. For instance, the immune response in leprosy patients was investigated by the Department of Biochemistry, All India

Institute of Medical Sciences, New Delhi. The results of a field study suggested that the production of peptides affecting macrophage function is deficient in untreated lepromatous patients; in a large number of cases, macrophage homing characteristics differed from the normal pattern.

1.153 In the Department of Dermatology, School of Medicine, Seoul National University, Republic of Korea, a small number of lepromatous patients with intolerance to chemotherapy and with severe clinical reactions were treated for 8-11 weeks with infusions of normal allogenic leucocytes from healthy donors. It was reported that clinical, histological and bacterial examinations showed a dramatic remission in the condition of all these patients within 2-3 months of the beginning of treatment. Further investigations are being made.

1.154 Studies on antigens prepared from mycobacteria are in progress at the WHO International Reference Centre for Serology of Leprosy, Ribeirão Preto, Brazil. An immunodiffusion analysis of cytoplasm from four lots of *Myco. leprae* and *Myco. lepraemurium*, 295 strains of different actinomycetales and 12 other bacteria was performed. Immunological relationships were revealed between the cytoplasm of *Myco. leprae*, *Myco. lepraemurium*, *Myco. avium* and several other mycobacteria, suggesting a possible basis for attempts to develop a polyvalent vaccine. The presence of auto-antibodies in lepromatous patients is being investigated at the same institute.

1.155 It was shown at the Institute of Leprology, Rio de Janeiro, Brazil, that lepromin prepared by a method developed in the Institute's laboratories remains stable for at least 5 years without requiring refrigeration.

1.156 Studies on the pathology of leprosy were carried out at the Department of Leprosy, Central Institute for Research on Skin and Venereal Diseases, Moscow. Histopathological findings in white mice infected with *Myco. leprae* and given antilymphocyte serum treatment showed cytological alterations indicative of significant immunological changes in the skin, the lymph nodes, and the spleen. The serum treatment did not, however, noticeably enhance the multiplication of *Myco. leprae*.

1.157 The activity of different enzymes was examined in 126 leprosy patients and 47 healthy controls at the Scientific Research Institute for the Study of Leprosy, Astrakhan, USSR. A disturbance of the oxidation reduction processes in the cells and tissues of the leprosy-infected organism was observed. The anaerobic type of metabolism found in lepromatous

patients suggested the presence of marked histotoxic hypoxia. This would lead to increased permeability of the vessels and tissues accompanied by loss of fluids, including proteins, into the intercellular space, thus creating favourable conditions for the development of autoimmunity in the patient. These findings throw new light on possible causes of reactive manifestations in leprosy.

1.158 The Institute of Leprology, Rio de Janeiro, Brazil, has begun studies aimed at improving methods now in use in the field for the early diagnosis and differential diagnosis of leprosy.

Bacterial diseases

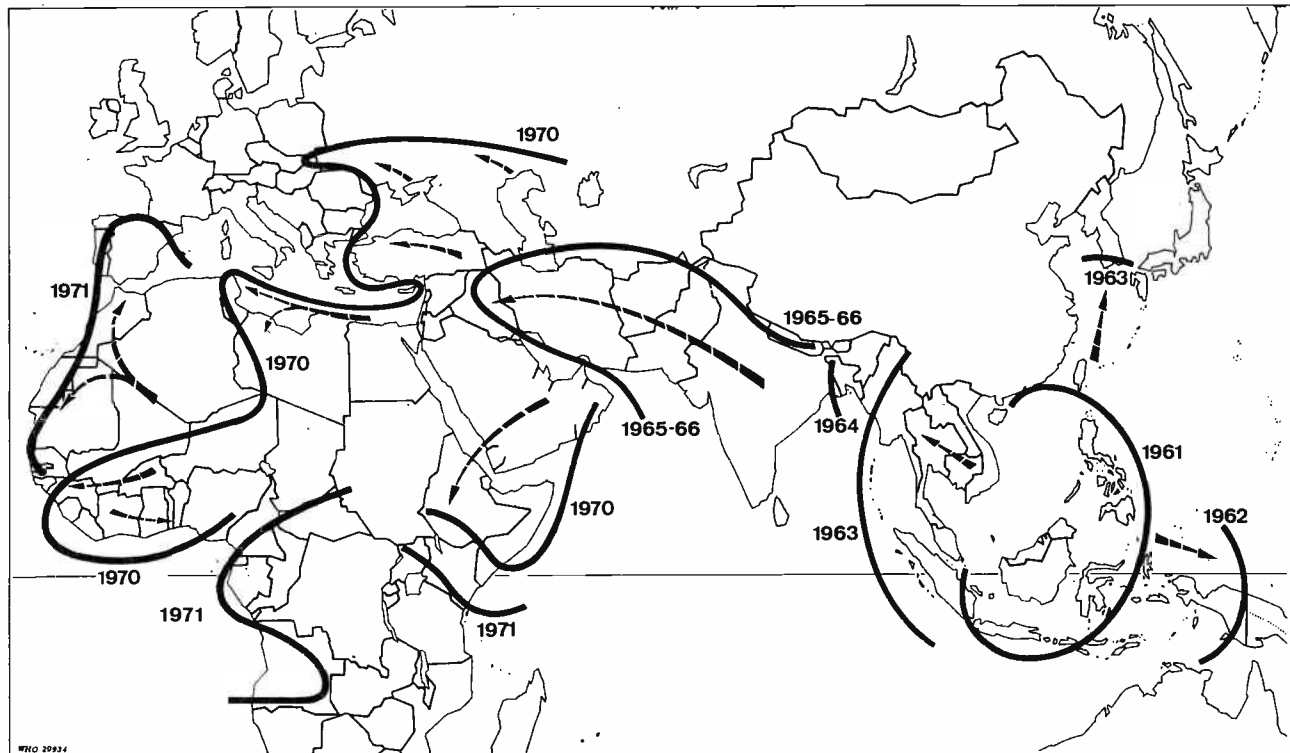
Cholera

1.159 Cholera, which was a dominant public health problem in the world for the previous two years, invaded no new country during 1972. The last territory where the introduction of cholera resulted in spread was Angola, at the end of December 1971. In most of the countries already affected recrudescences of the disease were not usually of a very serious nature. Altogether, out of some 60 countries or territories

that have been involved in this pandemic (Fig. 2), 18 in Africa reported about 5700 cases and 17 in Asia reported about 62 000 cases by 22 December 1972 (exclusive of countries with imported cases only). More than half of the total cases in Asia occurred in Indonesia, which had already suffered severe outbreaks in the preceding two years. Protracted outbreaks were reported in Malaysia and Singapore, but the numbers of cases were small. In sum, despite incomplete reporting and the suppression of information by some Member States (unofficial reports of outbreaks of cholera in some previously infected countries, none very alarming, remained unconfirmed), the cholera situation was on the whole better than in the previous two years. There is no room for complacency, however; cholera has become at least temporarily entrenched over a very wide area, representing a constant threat to the rest of the world, as was shown by a certain number of importations of the disease during the year, including some that were probably due to the consumption of contaminated food on board aircraft in international traffic.

1.160 The apparently spontaneous disappearance of cholera from certain parts of Africa after the initial outbreaks there may not reflect the real situation

Fig. 2. Spread of cholera in the seventh pandemic, 1961-72



because of the difficulties of proper surveillance. Nevertheless, the highly skilled WHO interregional cholera control team worked for about 5 weeks in one area (Mopti, in Mali) and isolated many strains of *Salmonella* and *Shigella* but no *Vibrio cholerae*. On the other hand, in some of the previously infected countries *V. cholerae* has occasionally been isolated from water in the absence of cases and carriers in the nearby community. These observations raise important epidemiological questions; however, the inadequacy or lack of basic health services in many of the areas concerned does not permit the assiduous monitoring of the situation that might provide the answers.

1.161 The Organization received very few requests for emergency assistance for cholera control as many Member States have gained knowledge and confidence; more countries are putting greater emphasis on the improvement of sanitation and health education and have refrained from, or not needed to resort to, mass vaccination. Whereas 36.5 million doses of cholera vaccine had to be provided by the Organization in 1970 and about 31 million in 1971, less than 4 million were required in 1972. The increase in the number of trained personnel—a situation which WHO has done much to bring about—has contributed to somewhat better reporting and to a reduction in case-fatality rates. In the African and South-East Asia Regions, for instance, the systematic dissemination of knowledge on cholera control has brought the treatment of cholera closer to the affected areas and to the sick. In certain situations in these Regions the case-fatality rates have been appreciably reduced, although they remain high in remote areas.

1.162 The pandemic has not reached the Region of the Americas but, in view of the possibility of its extension to areas with poor sanitation there, the Organization has strongly urged and assisted Member States to strengthen their surveillance activities and to be prepared for the treatment of cases should cholera be introduced into that continent. Inquiries were conducted into the laboratory facilities for the production of rehydration fluids as well as on the availability of antibiotics among States in the Region.

1.163 In view of the epidemiological changes and of an alteration in the attitude of many public health administrators, the Organization was able to direct more of its attention to the development of long-term cholera control undertakings with the cooperation of Member States. Following an informal consultation with technical experts from different Regions, outline plans, with related cost estimates, were prepared. The

success of this long-term programme may hinge upon generous contributions being received from Member States to the Special Account for the Cholera Programme, within the Voluntary Fund for Health Promotion, and upon the collaboration of the cholera-affected countries.

1.164 Members of the WHO interregional cholera control team visited 18 countries or territories during the year (Bangladesh, Democratic Yemen, Egypt, Ghana, Hong Kong, India, Indonesia, Kenya, Khmer Republic, Malaysia, Mali, Philippines, Republic of Korea, Saudi Arabia, Singapore, Thailand, Yemen, and Zambia) to help to train medical and auxiliary personnel, and to assist in the diagnosis, surveillance, treatment and control of cholera, in the local production of rehydration fluid and cholera vaccine, and in the establishment of rehydration centres.

1.165 Strains of *V. cholerae* from national laboratories were received and characterized by the WHO International Reference Centre for Vibrios, Calcutta, India, and the Centre provided them with diagnostic reagents and phages and collated and sent out valuable information on serotype and phage-type distributions.

1.166 Assistance was provided to several cholera-affected countries in the Eastern Mediterranean Region for training in rehydration and the establishment of strategically sited rehydration centres. The value of these centres extends beyond the treatment of dehydration caused by cholera alone to that which occurs in other enteric infections. Mention may perhaps also be made under the heading of cholera to the provision of assistance in the Western Pacific Region in an emergency which, though extremely serious, fortunately did not develop in the way feared. Following torrential rains in the Philippines, the Government sought international aid, partly because of the possibility that an epidemic of cholera might occur. The Organization responded by furnishing rehydration fluids, laboratory media and other necessities for the production of cholera vaccine, and other supplies on a reimbursable basis (see also paragraph 15.48). In the event, no cholera epidemic ensued, but most of the material supplied either was usable for other purposes or constitutes a valuable reserve.

1.167 Interregional seminars and training courses, with a total of about 80 participants from all WHO Regions, were held during the year, several of them with UNDP support. An interregional seminar for senior public health administrators (mostly at ministerial level) was held in Malaysia and Singapore

(in English) on the strategy of cholera control, with particular emphasis on the cost/effectiveness and cost/benefit aspects of different cholera control measures; the opportunity of this high-level meeting was taken to allocate two days to discussions on smallpox eradication as well. A second seminar on cholera and other enteric infections was held in Brazil (in English and Spanish) for the benefit of countries and territories in Latin America and the Caribbean; this dealt with the diagnosis, surveillance, treatment and control of cholera. Interregional training courses dealing with the same aspects of cholera were held in Ghana (in English) and in Mali (in French). In addition two regional courses on the laboratory diagnosis of cholera were organized in Jamaica (in English) and in Panama (in Spanish).

1.168 In a field trial conducted in the joint Philip-pines/Japan/WHO cholera research project, intra-dermal vaccination against cholera with 0.2 ml of monovalent vaccine containing 8×10^9 organisms per ml has been found to offer about 55% protection against clinical disease for 4 months, while the same vaccine given subcutaneously in 0.5-ml doses protected to the extent of some 73% for about 6 months. In another study, in Africa, the serum vibriocidal antibody response after intradermal inoculation was also found to be inferior to that produced by subcutaneous vaccination.¹

1.169 Several WHO-supported and other studies on the development of oral immunizing agents against cholera have shown encouraging results. Adult mice fed with cholera toxoid resisted intestinal challenge with live vibrios and cholera toxin. Oral administration of cholera toxoid to dogs was found to act as a good booster of antitoxic immunity and protected against challenge, although there was no rise in serum antibody titre; for primary immunization, however, oral administration was not sufficient. In a limited study in man, Inaba monovalent killed vaccine, given orally in 2-ml doses daily for 5 days on 3 occasions at intervals of 2 and 30 days, protected against challenges at 5-10 weeks with live *V. cholerae*, Inaba, to almost the same extent as when the vaccine was given parenterally. A live avirulent strain of *V. cholerae* developed as a result of genetic studies was confirmed to be avirulent in man in large doses and appears to be a good candidate strain for live oral immunization.

1.170 Joint investigations at the Cholera Research Centre of the Indian Council of Medical Research, Calcutta (which acts as the WHO International

Reference Centre for Vibrios) and the University of Florida, USA, showed that immunoglobulins (particularly IgA) appear in the intestinal contents of volunteers fed with killed cholera vaccine or with a naturally attenuated strain as a live vaccine. Biological activity of these immunoglobulins in the intestinal contents had not previously been demonstrable, but has now been shown by the technique² of opsonization and killing of *V. cholerae* in the mouse peritoneal cavity. A whole-cell cholera vaccine with aluminium hydroxide adjuvant that is no more reactogenic than conventional vaccine but that induces better and longer serological response in animals and in man was developed with WHO support in Hungary. The vaccine is also more potent by the active mouse-protection test. A field trial is being planned to evaluate its protective effect.

1.171 The problems of the purification of cholera toxin and the preparation of cholera toxoid are the subject of WHO-supported and other studies in Japan and the USA but have not yet been solved. Heat or formalin inactivation either destroys the antigenicity or results in a toxoid which reverts after parenteral administration. Natural cholera toxoid was found to cause reactions in monkeys and guinea-pigs. The addition of formalin to crude toxin in instalments with prolonged incubation up to 24 days appears to prevent reversion. Gluteraldehyde at certain concentrations has been reported to produce in 72 hours a stable toxoid which offers the possibility of having its efficacy enhanced or prolonged by combination with adjuvant. Although gluteraldehyde toxoid has the best prospect at the moment, a great deal more research will have to be done before the preparation can be released for a field trial.

1.172 WHO-supported and other studies during the year confirmed that antitoxic immunity can protect animals against both vibrio and toxin challenge; this protection could not be related to the serum antitoxin titre. Antitoxic immunity in dogs was also shown to affect the clinical severity of the illness, which is not influenced by antibacterial immunity. Genetic studies supported by WHO succeeded in separating the somatic antigen of *V. cholerae* from its toxin antigen by transferring the toxin-producing capacity to a strain of vibrio having a different somatic antigen. Animals immunized by these two separated antigens develop either antitoxic or antibacterial immunity. By challenging these animals with *V. cholerae* it was possible to show that antibacterial immunity is more protective than antitoxic immunity in experimental cholera.

¹ Macbean, A. M. et al. (1972) *Lancet*, 1, 527-529.

² Wernet, P. et al. (1971) *J. infect. Dis.*, 124, 223-226.

1.173 The recent unravelling of the mechanism of diarrhoea in cholera¹ made it possible to develop some pharmacological compounds which may prevent the outpouring of water and electrolytes in animals if administered with or before challenge,^{2,3} but none has yet been found that will counteract the effects of the toxin once it has become absorbed by the intestinal cells.

Other bacterial enteric infections

1.174 An outbreak of typhoid fever in Mexico early in the year brought the first report of this disease being caused by a naturally occurring chloramphenicol-resistant strain of *Salmonella typhi*. The drug-sensitivity pattern of this strain is similar to that of the multiple-drug-resistant *Shigella dysenteriae* type I,⁴ which has been responsible for epidemics of bacillary dysentery in Central America and Mexico since 1968, sometimes with a considerable death rate. Ampicillin has been the drug of choice for both these infections. These are instances of great epidemiological significance, emphasizing the need for continued surveillance to determine the characteristics of the causative agents, including their sensitivity patterns.

1.175 WHO has encouraged and supported the production and laboratory study of different oral live and killed enteric vaccines for experimental purposes, with a view to developing a more potent oral immunizing agent. In order to follow up the recommendations of a WHO Scientific Group on Oral Enteric Bacterial Vaccines, which met in 1971,⁵ and encouraging reports of success with a killed oral typhoid vaccine in Chile, a consultation was held in Geneva to discuss the various possibilities of further research with killed oral vaccine. Certain guidelines for the production of oral killed typhoid vaccines to be tried in the field, and for concomitant research on gut-associated immunity, were recommended. In continuation of earlier investigations, over 1000 persons were immunized in Yugoslavia with streptomycin-dependent *S. typhi*; studies of this type of vaccine are also under way in the USA.

1.176 A field trial of a parenteral typhoid vaccine produced from a non-motile variant of *S. typhi* (H-antigen deficient) by the Lister Institute, in the United Kingdom, was undertaken in Egypt. Follow-up

will continue for at least four years. If the vaccine proves to be effective, the lack of H antigen will have the additional advantage of not inducing a serological response of a type that interferes with the Widal test used for diagnostic purposes.

1.177 There was an increase in the number of reports from different geographical areas of diarrhoeal diseases associated with *Vibrio parahaemolyticus*, probably related to the consumption of raw fish or the improper handling of fish and other foodstuffs in the kitchen. No enterotoxin has yet been demonstrated in this organism. The epidemiology of this infection is being studied at the WHO International Reference Centre for Vibrios, Calcutta, India.

1.178 The WHO International Reference Centres for Enteric Phage-typing and for *Salmonella*, *Shigella*, and *Escherichia* continued their assistance to national laboratories in the identification and characterization of the various enteric pathogens. A new list of the antigenic formulae of the salmonellae, based on the Kauffmann-White schema and supplemented by formulae approved up to 31 December 1970, was issued by the International Reference Centre for *Salmonella* and distributed to national laboratories.

Plague

1.179 There was no essential change in the distribution of natural foci of plague in the world from that in 1971,⁶ but some foci that had been quiescent for many years suddenly erupted, causing small outbreaks involving some human cases. In the Khmer Republic, for instance, a few cases were recorded for the first time since 1957; and in Lesotho and the Libyan Arab Republic the Organization was asked to provide assistance after small outbreaks there early in the year. Supplies of diagnostic sera and antigens were provided to a number of countries in the South-East Asia and Western Pacific Regions. Help was also given to the local medical services in Burma, Indonesia and the Republic of Viet-Nam for the control and study of the disease. The latter country again reported the highest number of confirmed and suspected cases (over 1100). However, all the recorded figures for plague should be treated with caution. Over the past decade, some 25 000 people in the world have been reported to have suffered from the disease (with more than 1500 deaths), but it has been apparent in the course of WHO assistance missions to various countries that many patients are not seen and therefore go unrecorded. This was among the points that were stressed at the second South-East Asia regional

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.177.

² Jacoby, H. I. & Marshall, C. H. (1972) *Nature (Lond.)*, **235**, 1639.

³ Finck, A. D. & Katz, R. L. (1972) *Nature (Lond.)*, **238**, 273.

⁴ Mata, L. J. et al. (1970) *J. infect. Dis.*, **122**, 170.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 500.

⁶ See *Wkly epidem. Rec.*, 1972, **47**, 273-274.

training course on the epidemiology and control of plague, that was held in Mandalay, Burma, early in the year and attended by medical officers, including several epidemiologists, from throughout the Region.

1.180 In the Americas assistance was provided to the programme of investigation of the epidemiological and ecological factors which contribute to the maintenance of plague foci and to the occurrence of epizootics, carried out in Exú, Pernambuco, Brazil. Peru received assistance for the study of the taxonomy and ecology of rodents and fleas. In order to expand laboratory and field capabilities in the plague surveillance and control programme in Venezuela, the Organization collaborated in the training of personnel in the use of fluorescent antibody tests and passive haemagglutination tests and their application in the field. It also collaborated in plague surveillance and control programmes in Bolivia and Ecuador.

Cerebrospinal meningitis

1.181 There were a number of relatively limited outbreaks of cerebrospinal meningitis during the year both in countries in the African "meningitis belt" and elsewhere; and the Organization dispatched experts to assist in the control of this disease in Chad, Niger and Upper Volta as well as providing drugs from its stores in Brazzaville and Niamey. WHO also organized an African regional seminar in Lagos in March at which modern methods of surveillance and control of cerebrospinal meningitis were discussed by participants from 11 countries.

1.182 Continued collection and testing of *Neisseria meningitidis* strains, isolated throughout the world, by the WHO International Reference Centre for Meningococci, Marseilles, France, has shown that their resistance to sulfonamides is still increasing. The Centre has confirmed the presence of different antigenic groups of *N. meningitidis* in Africa, although the outbreaks have all been due exclusively to organisms of group A. In North America, the shift^{1, 2} in epidemic strains from group B to group C continued; group C is now far more prevalent in the USA and the majority of group C strains from North America are sulfonamide-resistant. An epidemic due to group C also occurred in South America (Brazil) during the year. However, it has already been shown³ that group C vaccine is effective in preventing cerebrospinal meningitis.

¹ Artenstein, M.S., Schneider, H. & Tingley, M.D. (1971) *Bull. Wld Hlth Org.*, **45**, 275-278.

² *Wkly epidem. Rec.*, 1971, **46**, 472-473.

³ Gold, R. & Artenstein, M.S. (1971) *Bull. Wld Hlth Org.*, **45**, 279-282.

1.183 As some evidence has indicated that a deficiency of serum IgM might be a factor predisposing an individual to meningococcal infection, a study was carried out by the Marseilles Centre and the WHO International Reference Centre for Immunoglobulins, Lausanne, Switzerland, among a population in an epidemic area in Niger to determine their serum immunoglobulin concentrations (IgG, IgA, IgM and IgE). No evidence could be obtained that either meningococcal meningitis patients or a corresponding control group suffered any immunodeficiency that could be associated with meningitis, and there is therefore no reason to suppose that the effectiveness of vaccination would be vitiated for this cause.⁴

1.184 Encouraging results were obtained in the controlled field trial of group A vaccine that is being sponsored by WHO in Egypt and conducted in collaboration with the Government of Egypt and the United States Naval Medical Research Unit No. 3.⁵ The vaccine is produced by the Mérieux Institute in Lyons, France, in cooperation with Rockefeller University, New York, USA; and the trial population in Cairo and Alexandria numbers some 122 000, divided into immunized and control groups. Not a single case has occurred in the former group since the trial began in November 1971, but there have been 10 cases in the controls; these were promptly and successfully treated. A further trial in a different population group in Egypt is being initiated to confirm these results.

1.185 Serological studies sponsored by the Organization and carried out in collaboration with Rockefeller University were also pursued in West Africa to determine the response to a new group A antigen given in various doses. In contrast to the results obtained in 1971, when it was found that the seroconversion rates were good but the vaccine failed to stop infection spreading, the 1972 results have been far more encouraging and further studies are planned.

Streptococcal infections

1.186 There has been growing interest in the problem of streptococcal infections in developing countries owing to the high incidence of streptococcal skin infections in tropical areas as well as to the many cases of rheumatic fever, rheumatic heart disease and glomerulonephritis to which streptococcal infections give rise. A programme for a WHO collaborative study on rheumatic fever that was prepared at a meeting in Cairo in February is described in paragraphs 4.5-4.7.

⁴ Rowe, D.S., Vandekerkove, M. & Grab, B. (1971) *Bull. Wld Hlth Org.*, **45**, 837-839.

⁵ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 19.15.

1.187 The WHO International Reference Centre for Streptococcus Typing, Prague, completed the first phase of an investigation, that is coordinated by the Centre, into the distribution and relative importance of streptococcal infections in selected developing countries. Serological studies on the levels of anti-streptolysin-O showed group A streptococcal infections to be ubiquitous and to present a public health hazard for all the populations under study. The Centre assisted many national laboratories by supplying them with reference preparations, training personnel, and advising on laboratory techniques. WHO also provided assistance for the improvement of laboratory techniques in several national laboratories, notably in Nigeria and Singapore.

Diphtheria, tetanus and pertussis

1.188 In a large number of developing countries in the Eastern Mediterranean, South-East Asia and Western Pacific Regions the control of diphtheria, tetanus and pertussis was promoted by WHO with UNICEF assistance in the course of immunization programmes, and the Organization helped national laboratories in the installation or improvement of facilities for the production of triple vaccine. Further studies on a vaccine that also contains an antityphoid component¹ were conducted in Western Samoa; these showed that this quadruple vaccine is safe and effective and may be used to advantage in countries with high morbidity and mortality rates from these diseases.

1.189 It has been observed in Mongolia that in spite of a very high coverage (about 95%) of the susceptible population with triple immunization, sporadic cases and occasionally also small outbreaks of diphtheria and pertussis occur in some areas. Epidemiological studies to determine the reasons are in progress.

1.190 It has been roughly estimated that some 500 000 persons (90% of them newborn infants) die annually from tetanus. The great majority of these deaths occur in developing countries, where the limited financial resources available to the health authorities must be used to the best advantage. It is important for the health administrators there to be able to evaluate the advantages of different strategies of tetanus control. An epidemiological model of tetanus was therefore developed by the Organization² that permits the simulation of various situations and of the effects of different immunization programmes and allows for cost/effectiveness and cost/benefit analyses to be made.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.201.

² Cvjetanović, B. et al. (1972) *Int. J. Epidem.*, 1, 125-137.

Veterinary public health (including Food hygiene and Comparative medicine)

1.191 As governments become more aware of the socioeconomic impact of zoonoses on their populations, more veterinarians are employed in health programmes, the field of veterinary responsibilities in human health expands, and veterinary students and faculties show a wider interest in the public health field. The WHO veterinary public health programme must reflect all these tendencies. By assisting studies in comparative medicine, the Organization helps to forge links between the human and veterinary medical professions. This programme expands each year as interprofessional communication grows and the practical value of comparative medical data is increasingly demonstrated.

1.192 In the Region of the Americas, the Pan American Zoonoses Centre, supported by UNDP, amplified its services to preinvestment projects and began to provide assistance on a Region-wide basis in planning, executing and evaluating zoonoses control programmes.

1.193 In the African Region, WHO assisted the Government of Uganda to set up a veterinary public health programme in that country. A three-man team provided specialist advice on the organization of the programme at the Ministry of Health level, food hygiene at the national and municipal levels, zoonoses surveillance, particularly in wildlife reservoirs, and laboratory animal medicine.

Rabies

1.194 The WHO Expert Committee on Rabies met in December to review the progress made in rabies surveillance and control and in the post-exposure treatment of the infection since 1965, when the last expert committee was convened. Particular note was taken of the development of more potent and safer vaccines for man and animals, the improvement of methods for assessing rabies control in wildlife, and the establishment of rabies surveillance systems.

1.195 The WHO International Reference Centre for Rabies at the Institut Pasteur in Paris reported on a new peroxidase antibody technique that appears to be equal in value to the fluorescent antibody method for the specific staining of both intracellular and extracellular rabies virus antigen.

1.196 An informal discussion on the FAO/WHO-coordinated research programme on wildlife rabies in Europe was held in July at the Rabies Research Centre

Zoonoses

At right: In Peru more than 100 000 goats from some 750 herds have been vaccinated against brucellosis. FAO and WHO have a long-standing collaboration in assistance for the control of this disease.

Below: Persons exposed to rabies infection can now be given smaller doses of an improved vaccine (right), by a much less painful procedure than when large doses were injected in the abdominal wall (left).



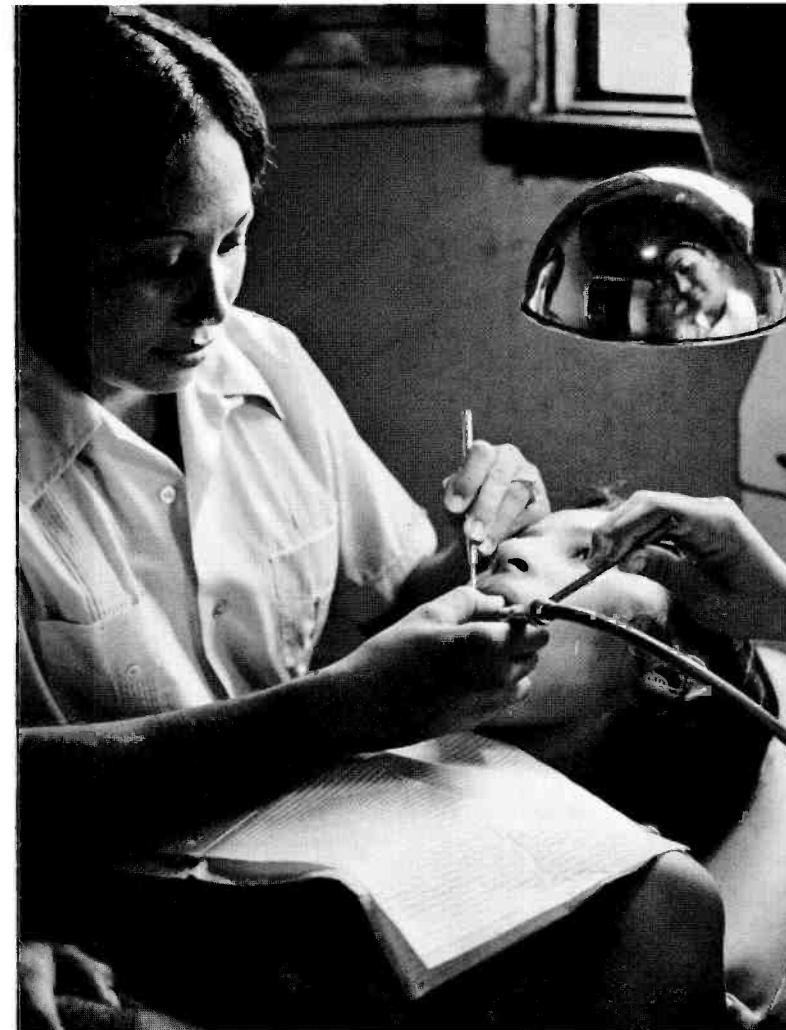


Leprosy

WHO has consistently encouraged the introduction of enlightened concepts of leprosy control.

At left: Leprosy case-finding among schoolchildren in a WHO-assisted project in the Republic of Korea.

Below: Leprosy work at the Central Immunological Laboratory of the Leprosy Institute, Caracas, Venezuela.



Dental health

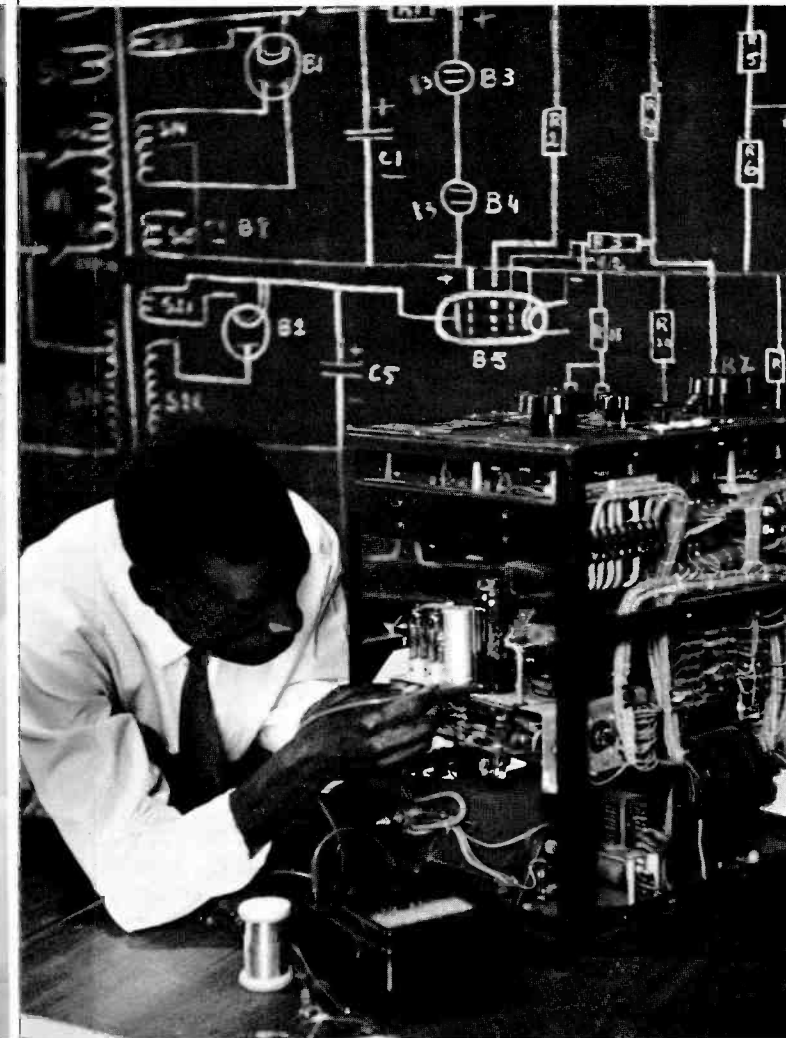
The Organization's dental health programme has been much concerned with the training of personnel.

At left: In an experimental dental clinic in Venezuela, students give dental care to local schoolchildren.

X-ray equipment

The proper maintenance of X-ray apparatus is essential for its proper operation and to avoid serious hazards to health.

Below, left: At a WHO-supported laboratory in the African Region, trainees learn how to repair X-ray equipment.



Tuberculosis

Below, right: In 1957, when this picture was taken, 90 million persons had been vaccinated with BCG, largely in campaigns assisted by WHO and UNICEF. The number is now almost incalculable: in 1972, some 12 million children were BCG-vaccinated in the Western Pacific Region alone.



Prevention of blindness

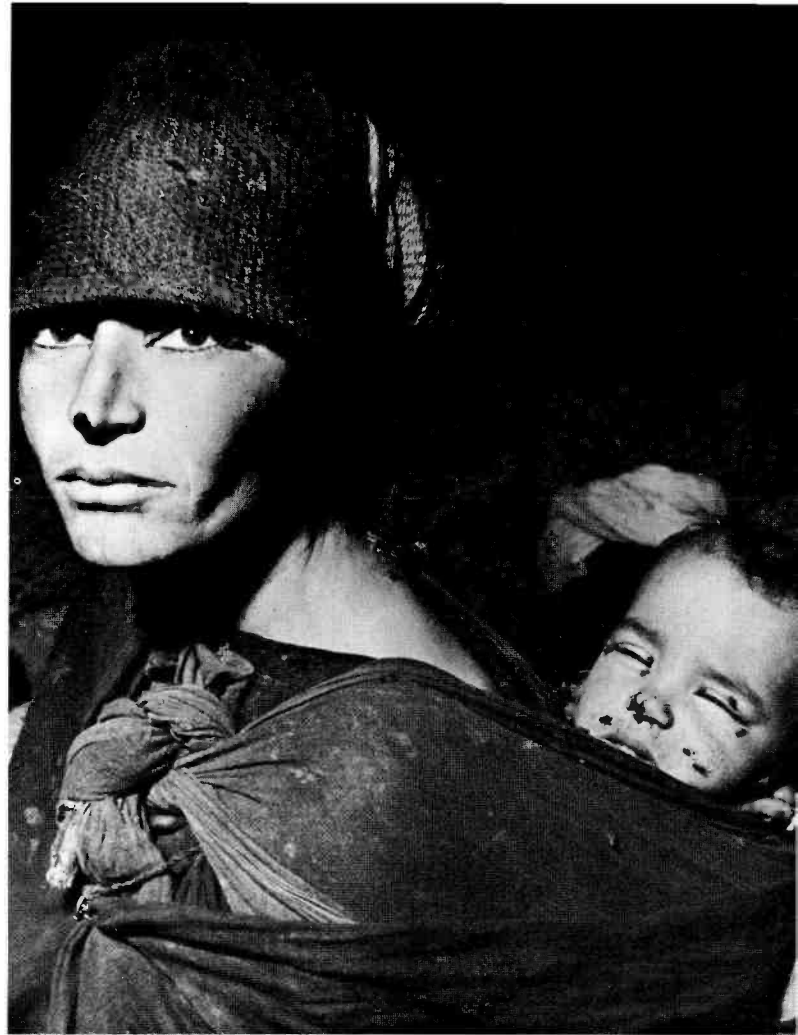
If untreated, eye infections frequently lead to blindness in later life.

At right: A mother from a Moroccan village brings her child to be treated for eye disease.

Rehabilitation

Below: Instruction in physical therapy during a course for WHO fellows organized by WHO and the Danish Government.

Below, right: A Japanese poliomyelitis victim slowly learns to use his crippled limbs.



in Nancy-Malzéville, France, and was attended by 37 investigators from 13 countries. The meeting noted that the majority of the original objectives of the research programme, which was initiated in 1968, had been attained during the first three years of the programme. It was confirmed that the red fox (*Vulpes vulpes*) is the most important vector of the disease in Central Europe. Badgers, martens and polecats constituted only a small proportion of the animals found rabid in different areas of the study. Within these species there was no indication of a cycle of rabies independent of that in foxes. Neither was any evidence found of the occurrence of subclinically infected carriers of rabies virus in wild carnivores.

1.197 Annual, large-scale gassing of fox burrows was found to be the most effective method of reducing the fox population below the critical level for transmission of rabies; it has apparently eliminated the disease from Belgium, Denmark, Luxembourg, and parts of the Federal Republic of Germany and Switzerland. Fox control measures do not appear to reduce the numbers of martens, polecats, weasels and small game and may sometimes tend to increase them. Nor do they seem to influence the rodent population. However, badgers may be in danger of extinction if gassing is employed extensively; such measures should therefore be avoided in areas where rabies is not a direct threat to public health.

1.198 About 40 virus strains of rodent-variants of rabies virus have now been isolated from microtine and murine species. They appear to differ in pathogenicity from fox rabies virus strains. Although the possibility that a natural focus of variants of rabies virus exists in rodents cannot be completely ignored, there is still no evidence from epidemiological observations in Europe to link fox rabies with any virus reservoir in rodents or in any other animal species.

1.199 The WHO Regional Reference Centre for Rabies in the Americas, at the Center for Disease Control, Atlanta, Ga., USA, made a study of the significance of rabies in rodents in the United States of America. In some state laboratories a third or more of the animals examined for rabies are rodents; yet out of 4392 rabies cases recorded in 1971 only 6 were in rodents. In the USA rabies-infected rodents are so rare that it is not usual to recommend post-exposure rabies prophylaxis following the bite of a rodent that is not available for examination.

1.200 In its rabies surveillance programme, the Pan American Zoonoses Centre, Buenos Aires, stresses the need to obtain laboratory confirmation of rabies diagnoses in Latin America. Since the beginning of

the programme in July 1969 there have been 46 448 notifications of rabies in animals in Latin America, but in only 43% of these cases has there been appropriate laboratory confirmation. The overall rabies situation in the Latin American countries did not improve significantly during the year; the number of cases of human and animal rabies decreased in some areas but increased in others.

1.201 In the Philippines, surveys undertaken by the Negros Oriental Provincial Central Laboratory, Dumaguete, indicate that the dog is the only animal responsible for the maintenance of the chain of rabies infection there. The disease was eliminated by using specially trained vaccination teams which succeeded in vaccinating about 80% of the dog population.

Venezuelan equine encephalitis

1.202 During the year surveillance of Venezuelan equine encephalitis was inaugurated in the Americas by the Pan American Zoonoses Centre, using a system of notification similar to that for rabies surveillance. The Centre issues regular bulletins containing summarized data on the occurrence of the disease, type of virus, and number of animals vaccinated. Small outbreaks continued to occur sporadically, mainly in the same areas where epidemics occurred in 1970-71. Disease-free areas were difficult to define because of inadequate diagnostic and notification procedures. A reference laboratory for diagnostic assistance and field and laboratory research in Venezuelan equine encephalitis began operation in Maracay, Venezuela, with support from the Ministries of Agriculture and Health, and from the Organization.

Foot-and-mouth disease

1.203 Sporadic outbreaks of foot-and-mouth disease occurred in all the affected countries of South America. Assistance was given to Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru and Venezuela in connexion with national foot-and-mouth disease control programmes. Those in Argentina, Brazil (States of Rio Grande do Sul and Santa Catarina), and Uruguay apply to the entire cattle population of 74 000 000 head. Loans by the Inter-American Development Bank to finance foot-and-mouth disease control programmes reached a total of US \$43 million to date. A reduction in the number of outbreaks was achieved in some countries.

1.204 The Fifth Inter-American Meeting on Foot-and-Mouth Disease and Zoonoses Control, which was held in April 1972, adopted resolutions on the develop-

ment of national diagnostic laboratories, the use and control of pesticides, the international movement of animals and the sanitary control of meat and other products of animal origin.

1.205 The pilot training unit for the industrial production and quality control of foot-and-mouth disease vaccines at the Pan American Foot-and-Mouth Disease Centre in Rio de Janeiro, Brazil, enrolled its first trainees at the end of the year. The Centre has also established a surveillance system for vesicular diseases of animals in South America; the information obtained is published monthly.

Brucellosis

1.206 Brucellosis is a major health problem of considerable economic significance in a number of countries where sheep or goats are raised and WHO works with FAO in assisting governments to control the disease. FAO is collaborating in a new five-year brucellosis control project in Mongolia which is supported by UNDP with WHO as executing agency. The objective is to establish a unit which will produce Rev. 1 and strain 19 *Brucella* vaccines for use in the large sheep, goat, cattle and yak populations of the country. By thus controlling brucellosis in the animal populations, the human population of Mongolia will also be protected against the disease. Actual production of vaccine and its utilization in the field are scheduled to begin in 1973. FAO will assist with the field studies of the effectiveness of the vaccines among the animal populations.

1.207 In the course of the work on immunoglobulin patterns in human populations in endemic foci undertaken by the WHO Brucellosis Centre at the Gamaleja Institute of Epidemiology and Microbiology, Moscow, one conclusion reached was that immunity could not be differentiated from latent infection on the basis of the presence of immunoglobulins. The Centre also reported on a study of the immunogenic properties of antigens isolated from the cell wall of *Brucella*. One of these antigens was an atoxic protein-polysaccharide complex which brought about immunity in an average of 85% of guinea-pigs vaccinated with one 0.6-mg dose and subjected one month later to a severe challenge with virulent *Br. melitensis* microbial cells.

1.208 At the Division of Medical Microbiology, School of Public Health, University of California, Berkeley, USA, work supported by WHO included the separation of a purified protein or polypeptide skin test antigen from smooth, acetone-killed *Brucella* cells. This antigen was able to detect delayed hypersensitivity in experimental animals while showing no capacity to stimulate the formation of antibodies.

The studies at the same laboratory on the effects of a fractionated antigen in monkeys, described in the Annual Report for 1971,¹ were continued, using larger doses of the soluble fraction of *Br. melitensis* antigen followed by scarification with live Rev. 1 vaccine and higher challenge doses of the virulent organism. The results confirmed the encouraging findings of the 1971 study.

1.209 A collaborating laboratory at the Faculty of Medicine in Tours, France, reported on biochemical studies on various fractions of *Br. abortus* and *Br. melitensis*. Brucella endotoxins appear not to resemble *Salmonella* or *Escherichia* endotoxins either in chemical composition or in biological activity. As regards the chemical composition of DNA, *Brucella* would seem to have similarities to certain *Pseudomonas* species.

1.210 The Pan American Zoonoses Centre in Buenos Aires continued its studies on the large-scale production of Rev. 1 vaccine in a liquid medium. The best results were obtained with the medium used for the production of *Br. abortus* strain 1119-3. The use of heat-inactivated cultures in saline administered intravenously for the production of monospecific *Br. abortus* and *Br. melitensis* sera in rabbits results in higher antibody titres in a few days than the use of live cultures and is a safer laboratory procedure. Studies were also continued on the oxidative metabolism tests for the identification of *Brucella* isolates. These tests were compared with conventional methods and it was found that their use made it possible to identify atypical strains correctly.

1.211 Among other activities in the Region of the Americas, advisory services or assistance in professional training were provided to Argentina, Chile, the Dominican Republic, Mexico, Nicaragua, and Uruguay on various aspects of their brucellosis control programmes.

Leptospirosis

1.212 Although considerable work has been done on leptospirosis in recent years, efforts to control or eliminate it are still hindered by gaps in knowledge. A review was therefore undertaken and a memorandum on the current position of WHO-supported research on leptospirosis was prepared and published.² The memorandum deals with recent advances and current problems in this field with special reference to taxonomy, epidemiological methods and control measures. Aspects of the basic biology of leptospires that are relevant to these topics are also discussed.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 1.217.

² *Bull. Wld Hlth Org.*, 1972, 47, 113-122.

1.213 One source of the discrepant findings of different laboratories when serotyping *Leptospira* strains may be the different media used. Research carried out at the WHO Leptospirosis Reference Laboratory at the Gamaleja Institute of Epidemiology and Microbiology, Moscow, demonstrated the influence of the media used for the maintenance and the culture of isolated strains on their virulence, antigenicity and agglutination properties. An evaluation of a number of synthetic media showed that the greatest density of growth of leptospires was obtained in albumin medium to which Tween-80 was added. The Institute also undertook experiments on the survival of *Leptospira* of the Hebdomadis serogroup in nature. The longest survival time recorded was 3.5 months on marshy soil with a pH of 7.5-7.8. The corresponding survival time for the same leptospires on soil with a pH of 6.0-6.25 was 4-5 days.

1.214 Research performed at the Pan American Zoonoses Centre in Buenos Aires on the use of activated charcoal to lengthen the survival of laboratory cultures has shown the superiority of this method over the use of Fletcher's medium without charcoal. The incorporation of neomycin in culture media intended for isolation purposes was shown to be effective in inhibiting contaminants without interfering with the growth of leptospires.

1.215 Some serological surveys were also reported during the year. The Gamaleja Institute in Moscow reported on the examination of sera from 1286 small mammals captured in Iran in the course of a WHO epidemiological research project (see paragraphs 12.22-12.23); only one specimen was found to be positive (to the *icterohaemorrhagiae* serotype). The Pan American Zoonoses Centre reported on two serological surveys. Out of 128 equine sera collected in northern Argentina, 70% gave reactions, the most frequent serotype being *pomona*; and a study of 2000 bovine sera showed that 95% reacted with antigens of the Hebdomadis serogroup.

1.216 The Organization assisted the Government of Barbados in a rodent depopulation programme intended to reduce the number of human cases of leptospirosis among sugar-cane workers.

Bovine tuberculosis

1.217 The Pan American Zoonoses Centre continued its research into the specificity of purified protein derivative (PPD) obtained from *Mycobacterium tuberculosis* and *Myco. bovis*. Experimental work in *Myco. bovis*-sensitized guinea-pigs indicated that *Myco. bovis*

PPD was significantly more potent than the human PPD. It was found that high-speed centrifugation was not essential for the preparation of efficient tuberculin PPD and that heating the cultures did not affect the potency but did reduce the specificity.

1.218 Guidelines and criteria for national control programmes for bovine tuberculosis in the Americas were developed by an advisory study group of specialists and animal health authorities.

Parasitic zoonoses

1.219 *Hydatidosis*. A WHO-supported study of the epidemiology of hydatidosis among the Lapps in northern Scandinavia was undertaken by a team from the National Bacteriological Laboratory, Stockholm. A strain of *Echinococcus granulosus* with a dog-reindeer life-cycle is prevalent in this area, but the additional occurrence of *E. multilocularis* with a fox-rodent cycle is suspected. Various sero-immunological diagnostic tests in the local human population revealed only mild positive reactions, some of which may be nonspecific. The same methods used in infected immigrants from south-eastern Europe gave clear-cut and stronger positive reactions. The reasons for this difference in reactivity are being studied.

1.220 The Pan American Zoonoses Centre, Buenos Aires, continued to assist the field control projects in Argentina and Uruguay, including epidemiological studies in wildlife and the strengthening of laboratory services for the immunodiagnostic screening of human cases. In a study made by the Centre of the role of wildlife in the epidemiology of hydatidosis in Neuquén Province, Argentina, natural infection was detected in the South American red fox (*Dusycion culpaeus*)—a species which can also be infected experimentally with cysts obtained from sheep. Pampas grey foxes (*D. gymnocercus*) became infected when fed similar cysts, but during a 60-day observation period the worms did not mature and become gravid. In parallel experiments, dogs became infected with worms which matured after 28 days, but grisons (*Galietis cuja*) and wild cats (*Felis geoffreyi*) remained uninfected. The infectivity for sheep and laboratory animals of worms obtained from red foxes is being studied.

1.221 A collaborating worker has described ¹ a new species, *Echinococcus vogeli*, from the bush dog *Speothos venaticus* of Esmeraldas Province in Ecuador; its epidemiological significance is not yet known.

¹ Rausch, R. L. & Bernstein, J. J. (1972) *Z. Tropenmed. Parasit.*, 23, 25-34.

1.222 A worker from the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Japan, was assisted by WHO in making a study at the University of Otago Medical School, New Zealand, of the effect *in vitro* of some 138 drugs on *E. granulosus* scolices. Certain interesting correlations were observed between the chemical structure of the drugs and their scolicidal activity. This study provided information on which to base the selection of new drugs to be used in experimental therapy of hydatidosis in laboratory animals.

1.223 *Cysticercosis-taeniasis*. In endemic areas calves are exposed early to infection with *Taenia* eggs and many develop an immunological tolerance. They may then remain permanent carriers of viable cysts and a source of human infection. In order to protect calves during their vulnerable period, the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, USA, used somewhat older calves to produce a high-titre serum which, experimentally, has protected newborn calves against heavy challenge. When this immune serum was given to infected calves, approximately 80% of cysts recovered at four weeks were in a state of degeneration as compared with 30% in calves given normal serum. These encouraging results of WHO-supported research indicate the possibility of passive immunization of newborn calves to tide over the period in which they are unable to develop strong immunity.

Socioeconomic aspects of the zoonoses

1.224 The Executive Board, at its forty-ninth session, in January, reviewed a report on the socioeconomic consequences of the zoonoses and, in resolution EB49.R11, requested the Director-General to maintain an active interest in the studies being pursued or to be undertaken in this field and to endeavour to assist these studies in collaboration with FAO, within the available financial resources. In November an informal meeting, co-sponsored by the University of Reading and WHO, was held in Reading, United Kingdom, at which a draft guide for conducting studies in developing countries was prepared. This is in two parts; one outlines the principles for socio-economic studies of the zoonoses, and the other is a manual for the study of a specific zoonosis (brucellosis) in a developing country. The group stressed the need to train animal health programme analysts to assist governments in evaluating animal disease problems from a socioeconomic point of view, evaluating priorities for action, and selecting among alternative control schemes. Their training should include epidemiology, economics, veterinary medicine and data processing.

*Food hygiene*¹

1.225 The main reasons for the sharp increase in food-borne diseases in man are the centralization of food production, distribution and consumption, the growth of international traffic in foods, and the massive and global proportions that tourism has assumed. The major problems encountered, particularly in the developing countries, are connected with food-borne diseases caused by viruses, bacteria, protozoa or more highly organized parasites. Most of these diseases are either zoonoses or are purely human diseases transmitted through foods of animal origin. The control of such communicable food-borne diseases is primarily the concern of the veterinary authorities in ministries of health or agriculture in countries throughout the world. WHO therefore works with FAO to assist governments in this central aspect of food hygiene.

1.226 An informal consultation on food virology took place in Brno, Czechoslovakia, and in Geneva in July to review the work carried out for the WHO food virology programme at the Veterinary Research Institute, Brno, and at the Food Research Institute, University of Wisconsin, Madison, USA. In Brno documents are being produced each dealing with a particular virus and recording its known properties relating to transmissibility through foods. The following have been dealt with: infectious bovine rhinotracheitis virus, porcine inclusion-body rhinitis virus, bovine herpesvirus, mammillitis virus, pigeon herpesvirus, Marek's disease herpesvirus, transmissible gastroenteritis virus of pigs, reovirus of porcine origin, and parainfluenza-3 virus of animal origin. The Madison team's research has been principally concerned with the incidence, detection or persistence of viruses in foods and collection of information on outbreaks of food-borne virus disease.

1.227 At the Pan American Zoonoses Centre research has been carried out on the change of the pattern of resistance of micro-organisms following the use of antibiotics for nutritional and prophylactic purposes in animal husbandry. *Escherichia coli* strains isolated from pigs that had received prophylactic doses of tetracycline during five days were found to show resistance to this and to related antibiotics.

1.228 WHO collaborated with the International Commission on Microbiological Specifications for Foods in a comparison of the results obtained using composite samples and individual samples for deter-

¹ Food additives and contaminants are discussed in paragraphs 6.55-6.71.

mining *Salmonella* in foods; these organisms constitute one of the main microbiological hazards involved in food consumption today. For dried foods of diverse types the analysis of 60 individual specimen units of 25 g provided no statistical advantage over the use of three composite specimens each comprising 20 × 25 g specimen units. A reduction of cost can thus be obtained without loss of sensitivity.

1.229 In other WHO-supported studies, the National Institute of Public Health, Bilthoven, Netherlands, reported on a method of primary isolation which gives more uniform and better results for the isolation of *Salmonella* from naturally or artificially infected minced meat than methods used hitherto. This work was carried out in collaboration with nine European laboratories.

1.230 At a FAO/WHO/UNICEF food control seminar held in Teheran in April, food control was discussed in relation to industry, commerce and the protection of the consumer.

1.231 In September, the Organization participated in two meetings held in the United Kingdom: the International Symposium on the Microbiological Safety of Food convened in Reading by the Committee of Food Microbiology and Hygiene of the International Association of Microbiological Societies; and the Eighth General Conference of the International Commission on Microbiological Specifications for Foods, which was held in Langford. At the latter meeting, a review was made of the second draft of a publication on sampling for microbiological analysis prepared by the Commission with the support of WHO.

1.232 In the Region of the Americas, the Government of Colombia received assistance in evaluating the status of food hygiene in the country, and advice was given to the Dominican Republic in formulating a food sanitary code.

1.233 In the context of the joint FAO/WHO Food Standards Programme, a number of meetings of FAO/WHO committees of the Codex Alimentarius Commission were held. In London in April, the newly established Codex Committee on Meat Hygiene reviewed the draft codes of hygienic practice for fresh meat and of ante- and post-mortem inspection of slaughter animals. The Codex Committee on Processed Meat Products held its sixth session in Copenhagen in April. Among other matters, the question of the nitrite required to inhibit the development of *Clostridium botulinum* was discussed. The Codex Committee on Food Hygiene met in Washington,

D.C., in June and dealt with international activities in the elaboration of microbiological methods applied to foods; the committee encouraged WHO to continue and amplify its efforts to coordinate the work of various international organizations, including the International Commission on Microbiological Specifications for Foods, in developing generally acceptable methods for the detection of *Salmonella* and other micro-organisms. At its seventh session in Bergen, Norway, in October the Codex Committee on Fish and Fishery Products continued its work on hygienic standards for various fish and fishery products.

Comparative medicine

1.234 Using computer facilities, WHO has now stored clinical and pathological data on some 25 000 animal cases sent in by a number of veterinary schools as well as pathological data on zoo animals. A start has been made in analysing these, and the data bank has been used to locate cases of the less common types of cancer for study in the Organization's comparative oncology programme and to facilitate investigations into other aspects of comparative medicine.

1.235 Some of the information in the data bank was considered at a meeting of collaborators in comparative oncology, which was held in Geneva in July. The main topic at this meeting was the histological classification of tumours of domestic animals. The classification of tumours at nine body sites is now completed for publication in the *International Histological Classification of Tumours* series. Work is partly finished on four more body sites and has started on three others. The meeting also considered the planning and coordination of therapeutic trials on naturally occurring tumours of domestic animals. Such tumours provide better models for testing new therapeutic procedures than do experimentally induced tumours in rodents, because the latter grow exceptionally fast and therefore respond more readily to antimitotic agents. WHO is helping to support two animal cancer registries to obtain information about the biological behaviour of tumours on which therapeutic trials can be based.

1.236 In its continuing studies on leukaemia in cats, the Glasgow Veterinary School, United Kingdom, has developed immunofluorescent techniques for detecting feline leukaemia virus antigens and antibodies. The virus was found to replicate not only in haematopoietic organs, but also in several epithelial tissues, including nasal and urinary epithelium. This suggests possible modes of horizontal transmission, and in experiments the virus has in fact been shown to pass

from infected cats to cats in contact with them and to set up the disease in the latter. Experimental work on the immunization of cats against the infection has begun. If successful, the vaccine may provide a good model for the development of vaccines against human leukaemia. The immunological techniques are also being used to look for group-specific leukaemia virus antigen in human leukaemia.

1.237 At the Veterinary School, Zurich, Switzerland, the lung tumours of animals have been studied for some years with WHO support and information has been collected on an appreciable number of cases. It appears that the frequency distribution of the various types of lung carcinoma in dogs is much the same as it was in man over half a century ago; in dogs there has not been the increase in epidermoid carcinoma and anaplastic small cell carcinoma that has been seen in man in recent years.

1.238 In October, a collaborating laboratory, the Nuffield Institute of Comparative Medicine, London, organized an informal international symposium on current cardiovascular research in animals. A wide range of work was discussed, especially on atherosclerosis, mitral fibrosis, blood coagulation, and the effect of social stress on arterial lesions.

1.239 Stenosing lesions of the intramural arteries are commonly found in many species of animals but have been reported only rarely in man. At the Berne Veterinary School, a histological examination was therefore undertaken of 223 human hearts from people who died as adults from myocardial infarction or a variety of other diseases, in order to investigate the frequency and severity of stenosis of the intramural coronary arteries in man and its relationship to stenosis of the extramural coronary arteries and to myocardial infarction. A general correlation was found between the lesions in the arteries in the two regions of the hearts, but in some instances a minor grade of extramural coronary stenosis was associated with advanced lesions of the intramural coronary arteries and myocardial micro-infarction.

1.240 WHO-supported studies on blood coagulation were continued at the Nuffield Institute of Comparative Medicine, London. Problems of immunity to therapeutic preparations sometimes arise in human haemophiliacs treated for lack of factor VIII. Experiments in patas monkeys showed that azathioprine was completely effective in preventing the development of antibodies against therapeutic preparations whereas other immunosuppressants had either no effect or only a partial effect. These findings have already been

successfully applied in some human cases. The effect of haemorrhagic stress on blood coagulation processes is also being studied. Sheep subjected to acute haemorrhagic stress develop diffuse intravascular coagulation; it has been found that this can be prevented by an adrenergic blocking drug. These studies are now being transferred to human patients undergoing major surgery.

1.241 In studies at the Veterinary School, Sydney, Australia, on congenital defects in the offspring resulting from hyperthermia of pregnant guinea-pigs, it was found that the size of the offspring's brain was reduced and that this smaller brain size was accompanied by a marked reduction in learning capacity. *In vitro* studies showed that a moderate degree of hyperthermia ($+2.5^{\circ}\text{C}$) damages embryo cells that are in mitosis. This could explain the teratogenic effect of heat and suggests that it might also have a mutagenic effect. Arrangements have been made for hyperthermia experiments to be done in pregnant non-human primates. Studies are also being initiated to determine whether the teratogenic effects of malnutrition and hyperthermia are additive and irreversible.

1.242 In recent work supported by WHO in Munich, Federal Republic of Germany, a measles-like virus isolated from cases of subacute sclerosing panencephalitis (SSPE) in children was inoculated into sheep and calves, and these then developed SSPE. Moreover, some cases of a similar disease occurring naturally in calves have been detected. In dogs several cases of naturally occurring SSPE have been studied in Glasgow, United Kingdom, and a distemper-like virus has been isolated by co-cultivation of astrocytes from affected brains with dog kidney cells. Distemper and measles viruses are very closely related.

1.243 The nutritive requirements of non-human primates in essential fatty acids were studied at the Nuffield Institute for Comparative Medicine. The unexpected illness and death of some laboratory monkeys were found to be due to a diet low in linolenic acid although adequate in linoleic acid. It has generally been held that only one of these acids is required; the possibility that both are needed may be significant also for human nutrition since some margarines contain only linoleic acid.

1.244 A consultation to review the veterinary aspects of laboratory animal medicine was held in Geneva in December with the participation of specialists from the Regions of the Americas, Europe and the Western Pacific. The questions discussed included the contribution of laboratory animal medicine to the

standardization of laboratory animals, the future direction of research in this field, and the need for veterinary training in laboratory animal medicine.

1.245 *Comparative microbiology.* In April a consultation was held in Munich, Federal Republic of Germany, on the WHO/FAO programme on comparative virology which now comprises 15 international teams, each responsible for studying one group of viruses. As many as 125 laboratories in 19 countries are collaborating in this programme. The consultation was attended by 36 scientists, including public health veterinarians, from nine countries.

1.246 Two new teams have been established, one to deal with rhabdoviruses and the other with equine picornaviruses and bovine rhinoviruses. Reference strains for 58 animal viruses have already been defined and work is well advanced for the definition of 75 candidate reference strains of distinct serotypes. Working sera have been prepared against all these viruses. Monospecific antisera against 18 viruses were produced in gnotobiotic animals as grade 1 reference sera and 16 antisera were prepared in conventionally raised animals as grade 2 reference sera. All these sera are being tested.

1.247 In a comparative study of 80 porcine picornavirus isolates it was noted that there was considerable cross-neutralization, allowing the viruses to be divided into eight groups. Cross-reactions also pose problems in defining types of feline caliciviruses; a clear definition of a serotype of caliciviruses is being elaborated. The typing system used for human rhinoviruses is being adopted in order to establish uniform typing for human and animal viruses and to ensure a certain standardization of laboratory techniques.

1.248 In 1972, the Division of Microbiology and Infectious Diseases at the Southwest Foundation for Research and Education, San Antonio, Texas, USA, was designated as a WHO Regional Reference Centre for Simian Viruses.

1.249 To probe the origin of the major antigenic shifts in influenza viruses that periodically bring about new pandemic strains, and thus to provide the knowledge needed to prepare appropriate vaccines, WHO continued to assist comparative studies on human and animal influenza viruses, among them those conducted at the John Curtin School of Medical Research, Canberra, and the St Jude Children's Hospital, Memphis, Tenn., USA. These last-mentioned investigations have provided striking new biochemical evidence to support the view that the strain causing the pandemic of Hong Kong influenza in the years

1968-71 arose, not by mutation, but by genetic recombination, the neuraminidase antigen being derived from the human parent strain (A2/Asia) and the haemagglutinin antigen from an animal strain (avian or mammalian). These and other studies on various aspects of animal influenza, published in a special issue of the *Bulletin of the World Health Organization*,¹ confirm the importance of animals as potential reservoirs of, or contributors to, new pandemic strains of the virus.

1.250 In January a consultation was held of participants in the FAO/WHO programme on animal mycoplasma characterization, which now comprises international teams for the study of avian, bovine, caprine and ovine, porcine, and laboratory animal mycoplasmas. Eleven type strains of bovine mycoplasmas have been agreed upon. According to preliminary studies ovine and caprine mycoplasmas can be divided into 12 groups. The team for avian mycoplasmas decided upon the names and reference strains for six species. These collaborative studies are being coordinated by the FAO/WHO International Reference Centre for Animal Mycoplasmas, Aarhus, Denmark.

Prevention of blindness

1.251 Hitherto the Organization's programmes concerned with blindness have been concentrated on some of the most important conditions leading to blindness in the developing countries: communicable diseases such as trachoma and onchocerciasis (for which reason the subject is considered in this chapter) and xerophthalmia. However, in pursuance of resolutions adopted by the Twenty-second and Twenty-fifth World Health Assemblies (resolutions WHA22.29 and WHA25.55) a much broader approach is being developed.

1.252 A report on the available information on the world prevalence of blindness was presented to the Twenty-fifth World Health Assembly. It was largely based upon answers to a questionnaire sent by WHO to all Member States and Associate Members. Though data were not available from some countries and not complete from others, it was evident that a previous gross estimate of 10 million blind persons in the world was by no means an exaggeration—indeed, it was probably an underestimate. It was considered that for more than half of these persons permanent loss of vision could have been prevented if it had been

¹ *Bull. Wld Hlth Org.*, 1972, 47, No. 4.

detected and treated in time and for many there would have been no visual impairment whatever had they not suffered from a relevant communicable disease or malnutrition. One consequence of the global smallpox eradication campaign, for instance, is that new cases of blindness due to this disease have disappeared almost everywhere. Similarly, the risk of the ocular complications of leprosy has been diminished by better treatment methods, and vaccination on a wide scale should greatly reduce the number of visual defects due to measles. However, other more intractable diseases, communicable and noncommunicable, still cause a heavy burden of visual impairment, and the Twenty-fifth World Health Assembly, in the resolution mentioned above, called *inter alia* for further studies on the most efficient and economical means of preventing blindness and for intensified assistance to national programmes to this end, especially those concerned with trachoma, onchocerciasis and xerophthalmia. Activities in these particular fields are dealt with earlier in this chapter and in Chapters 2 and 9. Mention may be made here of a blindness study conducted during the year in the Western Pacific Region. An unusually high prevalence of cataract is found among

the Marshallese in the Trust Territory of the Pacific Islands, and in August a WHO investigation of this situation disclosed a close relationship between that condition and diabetes; further studies should ascertain the causes and determine the most appropriate form of prevention. Mention should also be made of the activities already established in the European Region in studying the problems of blindness in developed areas where communicable diseases play an insignificant role in the etiology.

1.253 In November the Organization convened a study group which reviewed the problem of the prevention of blindness in detail and made a number of recommendations as to future activities, putting particular emphasis on trachoma, onchocerciasis, xerophthalmia and cataract. In addition, the group made other specific suggestions concerning prevention, early detection and treatment of loss of vision, as well as broader proposals on the coordination of activities to be carried out at the national and international levels together with other organizations within the United Nations system and with nongovernmental organizations.

2. MALARIA AND OTHER PARASITIC DISEASES

Malaria

2.1 Much attention was focused during the year on the development of antimalaria operations in those countries and areas where it is not as yet feasible to undertake a malaria eradication programme in the strict sense of the term, i.e., in which all operations and their timing are broadly planned from the initial stages of the programme and in which the aim is the complete suppression of transmission of the disease within a foreseeable time and the prevention of its re-establishment. In many countries, particularly in Africa, such programmes are, for administrative, financial and logistic reasons, not feasible at the present stage of development, nor in some areas are the normal operational methods effective. Discussions on this problem, the scientific aspects of which are being studied in the malaria field research project at Kano, Nigeria (see paragraph 2.30) were the central feature of a conference held in Brazzaville for countries where time-limited malaria eradication is at present impracticable (see paragraph 2.32). Some of the methods applicable in this situation were taught and demonstrated at the seminars on antilarval operations and on malaria entomology mentioned in Chapter 10 together with other aspects of training.

2.2 No instances of re-establishment of malaria were reported in 1972 from those countries which had previously completed the attack and consolidation phases¹ of their malaria eradication programmes but where eradication has not yet been certified—namely, Albania, Brunei, Cuba, Israel, Japan (Ryukyu Islands), Lebanon, Mauritius and Yugoslavia. Reviews of programmes in connexion with the revised strategy of malaria eradication were carried out by the Governments of Ethiopia, Indonesia, Malaysia (Sabah), Mexico, Nepal and Paraguay in collaboration with the Organization and, where appropriate, with UNICEF and USAID.

Progress in antimalaria operations

2.3 In Africa, assistance was given to a number of antimalaria programmes through the medium of intercountry projects rather than through individual country-based projects, as this has been found more expedient and practical; in Chad, antilarval measures were organized in Fort Lamy, using difenphos; in Equatorial Guinea, a study of the malaria situation was made; in Gabon, advice was given on the use of propoxur in a vector control programme in Libreville; in Senegal, where there is an organized system for the widespread distribution of chloroquine, assistance was given for mapping the areas for this distribution; in Swaziland, where advisory assistance was also given, additional funds have been made available by the Government for the malaria control programme; in Zambia, where a general malaria survey carried out in many areas of the country indicated a very varying endemicity of malaria, parasitological baseline surveys have been completed in the Eastern Province and a combined malariometric/trypanosomiasis survey is being made in the Northern Province. In other programmes in Africa, assistance in antimalaria operations is provided within that for the development of basic health services. For instance, expert advisory services on malaria have been provided to Cameroon, where residual insecticides are applied in the chief urban areas; to the Comoro Islands, where microscopists have been trained; in Guinea in respect of malaria surveys; to Liberia, where a larviciding programme is carried out in Monrovia; to Nigeria, where advice has been provided to most of the states on malaria control and where activities are being undertaken in a number of towns; and in Togo, where 10% of the hospital admissions and 43% of clinic attendances are due to malaria, trials of once-yearly indoor spraying of 2 g/m² technical DDT in a pilot area of Palime resulted in the disappearance of the important malaria vector *Anopheles funestus*, and also of *An. nili*, from the area.

2.4 In the Region of the Americas, the situation in Argentina, British Honduras, Costa Rica, Dominican Republic, Panama and Paraguay has been satisfactory, although small outbreaks of malaria have occurred in some of these countries. In Panama, for example, an outbreak of falciparum malaria occurred in the region

¹ A malaria eradication programme is divided into four phases: the preparatory phase, characterized principally by geographical reconnaissance and training of staff; the attack phase, during which total coverage house-spraying, or other attack methods, are applied; the consolidation phase, during which these attack measures have ceased and surveillance is carried out; and, lastly, the maintenance phase, during which vigilance operations aim at preventing the re-establishment of the disease.

of the Canal Zone at the end of 1971 and continued into 1972 in an area where the vector is resistant to DDT and the parasite shows tolerance to chloroquine; propoxur was used to overcome this outbreak. In Brazil, areas with a population of 3.5 million in the State of São Paulo entered the maintenance phase, and elsewhere in Brazil other areas were advanced to the consolidation phase. As regards the four countries in Central America where propoxur is also being used to deal with areas of refractory malaria, the situation in Guatemala, Honduras and Nicaragua appears to be improving; however, in El Salvador the intensity of infection remained as in 1971, with 20 000 cases in the first six months. There has been little change in the situation in the programmes in Bolivia, Colombia, Ecuador, French Guiana, Peru and Venezuela. In Guyana, where the prevalence of malaria had remained at a very low level since 1968, two foci of infection developed in the first quarter of the year and more than 200 cases have thus far occurred. In Mexico, the Organization assisted the Government to review the programme activities and it was recommended that the Government's full support to the programme should be continued, but that the resources available should be redeployed to deal better with the more difficult and refractory areas. In Surinam residual spraying has now been discontinued owing to the reluctance of some of the population in the hinterland to admit persons to their villages or dwellings. This has resulted in low coverage, despite extensive health education measures and the use of local staff. In several cases of malaria a reduced sensitivity of *Plasmodium falciparum* to chloroquine has been found, and amodiaquinized salt is being distributed as a control measure instead of chloroquinized salt.

2.5 In the South-East Asia Region, the malaria eradication programme in Bangladesh, which had previously progressed very satisfactorily, was naturally considerably disturbed by the upheaval in that country, which received assistance from the United Nations Relief Operations in Dacca and from WHO in the form of supplies, equipment and technical support. A reassessment of the changed epidemiological and operational situation was made with WHO assistance, and plans of action have been made to retrieve initially the ground that has been lost. For antimalaria operations in Burma, the Organization assisted in meeting local costs and by the award of fellowships. In India, where over a million cases of malaria occurred in 1971, half of these being reported in Gujarat State, more intensive measures are being taken and the timing of attack operations has been adjusted to fit local epidemiological conditions more closely. The Government of India, rather than the

municipalities, is now responsible for the control of urban malaria, and it is undertaking a pilot project in Jodhpur City to test the use of ultra-low-volume spraying of malathion. The malaria control programme in Indonesia is being intensified and a million more people in Sumatra and some of the outer islands have been brought within the programme. A special series of refresher courses was given with WHO assistance for some 300 microscopists. An assessment of the programme was made in June-July. In the malaria control project instituted in the Maldives half the total population is now receiving protection. In Nepal, where the incidence of malaria in 1971 in the whole country had been reduced to 0.047 cases per 1000 population, a programme review recommended strengthening of the basic health services in areas in the advanced consolidation phase. Areas with a further million population were considered to be sufficiently advanced to enter the consolidation phase. In Sri Lanka the epidemic of vivax malaria which first became obvious in 1967 is continuing to abate. However, there has been an increase in the number of falciparum cases and mass drug administration was carried out in areas in which these occurred. Although in Thailand it was considered that spraying could be withdrawn in some areas, with a population of 2.3 million, the general situation has deteriorated, with a doubling of the case rate in consolidation-phase areas in the last five years, and an increase by $2\frac{1}{2}$ times of the case rate in the attack-phase areas. With the assistance of WHO the training facilities at the national Malaria Training Centre in Phra Putthabat have been intensified.

2.6 In the European Region, the general situation continues to improve in Algeria, where over 600 000 persons live in areas in the consolidation phase and $3\frac{1}{2}$ million more are receiving protection by residual insecticides or antilarval measures in the attack phase. However, one of the vectors, *Anopheles labranchiae*, which is already resistant to dieldrin, is showing tolerance to DDT as well, though this finding may not have operational significance for some years. In Morocco, following an increase in the number of cases in 1971 to double that of 1970, a further increase was noted in the first six months of 1972 with an outbreak of falciparum malaria in the west and south-west. A population of about $1\frac{1}{2}$ million is protected by residual spraying, and fenthion is used as a larvicide. In Turkey, particular attention has been given to containing the foci which occurred in 1971 in consolidation-phase areas, especially in the south of the country around Adana. In France, on the island of Corsica, a few indigenous cases of malaria occurred in 1971 but

no such cases were reported up to July 1972 following the measures taken.¹

2.7 In the Eastern Mediterranean Region, besides Cyprus, Israel and Lebanon, where malaria transmission has ceased for some years, steady progress towards eradication of malaria has continued in the programmes in Iran, Jordan, Libyan Arab Republic, Syrian Arab Republic and Tunisia, in all of which the incidence has fallen to low levels. In Iraq, where malaria incidence is also low in the southern and central liwas, a sharp upsurge of the disease, following unusually high rainfall, appeared in the northern region; prompt anti-epidemic measures were applied. Both financial and technical difficulties continue to hamper the programmes in Afghanistan and Pakistan; both countries suffer from vector resistance to DDT, necessitating the use of the more expensive insecticides, and from a lack of resources to pay for them. In Ethiopia, Somalia and Sudan, antimalaria operations are progressing and priority is given to development areas. In Egypt, where *An. pharoensis* is resistant to DDT and dieldrin, there are signs that the malaria incidence is rising, owing to conditions created by the increase of rice cultivation; in the meantime, both the Egyptian and Sudanese Governments are applying measures to prevent a further invasion of *An. gambiae* from Sudan into Egypt. Improved antimalaria measures are being taken in Democratic Yemen and in Yemen. In all the above-mentioned programmes, WHO assistance is given in the form of long-term or short-term advisory services and of supplies. The interest in the use of antilarval measures of various kinds, either supplementary to the use of residual insecticides in eradication programmes or, in other cases, in the absence of spraying, is increasing steadily in the Eastern Mediterranean Region. Besides the well-tried and accepted oil and detergent mixtures used in Iran and Iraq where oil is cheap, a growing number of programmes are either using difenphos on an operational basis following successful trials by the Government and WHO (as in Afghanistan and Jordan), or are conducting trials of their own (as in Somalia and Sudan). There has also been an increase in the use of such biological agents as larvivorous fish: *Gambusia affinis* is used on an operational basis in Afghanistan and Iran and *Notobranchius guntheri* in field trials in Somalia.

2.8 In the Western Pacific Region, nine antimalaria programmes received assistance from WHO. In the British Solomon Islands Protectorate the incidence of falciparum malaria in the most populated island,

Guadalcanal, has been halved since the Government implemented a malaria eradication programme in 1969. Training courses were held in 1972 for microscopists and malaria technicians. In the Khmer Republic attention has been given to the use of prophylactic drugs for workers in areas of economic importance. In Laos, extensive antimalaria measures around the Nam Ngum Dam area have continued to prevent the disease interfering with the construction work and with settlement. The programme in West Malaysia has advanced according to plan in respect of populations in areas in the attack and preparatory phases. However, transmission has not been completely interrupted in some of the areas where the programme was first started. In view of refusals by householders in a number of areas to permit the spraying of DDT wettable powder, which disfigures the polished wood used indoors, the introduction of a DDT emulsion formulation which is more acceptable to the population is under study. In the two programmes in East Malaysia antimalaria activities are continuing and efforts are being made to maintain the gains already obtained, but resistance of *P. falciparum* to chloroquine has been confirmed in Sabah. In the New Hebrides training has been given to laboratory technicians and surveys have continued in the various islands. In Papua New Guinea, following advisory assistance, there has been a consolidation of the programme that is now protecting half the population. In areas of the Philippines where malaria has proved refractory to residual spraying with DDT, propoxur has also been used, and, for larviciding, difenphos. It was recently discovered that, unknown to the Philippines Government and to the Organization, foreign scientists had introduced into Palawan Island a laboratory colony of the notorious vector of malaria in Africa, *Anopheles gambiae*, in order to conduct experimental studies. This colony was destroyed at the request of the Government and, since it was possible that some vectors might have escaped from the colony, some of the resources of the WHO-supported malaria programme had to be diverted during the year so that extensive entomological surveys could be made and wide-scale antimosquito measures introduced to ensure that *An. gambiae* did not establish itself in the Philippines. Fortunately the fact that careful searches by special teams have so far yielded no captures of the vector in either the adult or the larval stages gives hope that this menace has been overcome in good time.

2.9 On 30 September 1972, of the estimated 1821 million² people living in the originally malarious

¹ *Wkly. epidem. Rec.*, 1972, 47, 329.

² From information available.

areas of the world, 1352 million (74.3%) were in areas where malaria had been eradicated or where eradication programmes were in progress. Of these, 721 million (39.6%) of the population of the originally malarious areas were living in areas in the maintenance phase; 303 million (16.7%) in areas in the consolidation phase; 324 million (17.8%) in areas in the attack phase; and 3.5 million (0.2%) in areas in the preparatory phase. Of the 469 million people (25.7%) living in areas where eradication programmes were not yet in operation, 119 million were benefiting from malaria control measures, while governments were making an organized effort to ensure that antimalaria drugs were available as a control measure for a further 83 million. The Organization assisted 44 malaria eradication projects and 24 projects for other types of antimalarial action during 1972.

Research

2.10 During 1972, WHO concluded 39 new or renewed agreements on malaria research to study the biology of the parasite, the epidemiology of the disease and its chemotherapy, resistance of the parasites to drugs, and the methodology of operations. The following pages summarize some of the research activities that have been assisted by the Organization.

2.11 *Biology of the malaria parasites.* Much attention has been devoted to the improvement of methods of cultivation of the parasite along the lines indicated in a *Memorandum on Cultivation Techniques for the Erythrocytic Stages of Malaria Parasites*.¹ Both the Department of Tropical Medicine, Liverpool School of Tropical Medicine, United Kingdom, and the Division of Parasitology, National Institute of Medical Research, London, have carried out work on the metabolism of the malaria parasite; the latter institute has particularly studied DNA and RNA synthesis^{2, 3, 4} and the metabolic pathways in erythrocytes parasitized with *P. knowlesi*. In the Gambia, investigators of the same institute were able to subculture *P. falciparum* in human blood *in vitro* through three complete asexual cycles in seven days.⁵ Previous attempts using *Aotus* blood have been unsuccessful, though a cooperative study with the WHO Collaborating Laboratory for the Development of Malaria Serological Techniques,

Nuffield Institute of Comparative Medicine, London, had shown that extracts of blood from *Aotus* monkeys infected with *P. falciparum* contained all the clones of malaria precipitins so far identified in human blood.⁶ At the Department of Therapeutic Radiology, Tufts University School of Medicine, Boston, Mass., USA, investigations are being made on the changes produced in the erythrocyte membrane by malaria parasites and of the enzyme mechanisms involved. At the Department of Preventive Medicine, New York University Medical Center, USA, work was carried out on ookinete development. Electron microscopic studies on the oocyst of *P. berghei* at the Department of Parasitology, Liverpool School of Tropical Medicine, United Kingdom, demonstrated that there was no evidence for the disappearance of the nuclear membrane during post-meiotic nuclear division which occurs in three distinct phases. The site and pattern of meiosis in the plasmodia has significance in respect of the genetics of the parasite.⁷

2.12 In their study on rodent malarias designed to develop experimental models for screening of potential antimalarial compounds, the Laboratory of Zoology, National Museum of Natural History, Paris, have found that the tree rat *Thamnomys*, when infected with *P. vinckei chabaudi*, harbours slowly developing schizonts; this finding may assist in elucidating the cause of relapses. The Department of Malaria, Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium, has succeeded in obtaining cyclical transmission of *P. vivax* in *Aotus* monkeys.⁸ In Brazil, the Department of Parasitology, University of Minas Gerais, Belo Horizonte, in searching for simian hosts of malaria parasites, found *P. brasilianum* infecting the red titi monkey (*Callicebus moloch cupreus*) and the pale-faced saki (*Pithecia pithecia*); each of these species represented 1% of 1900 monkeys examined. In Sabah, East Malaysia, investigators from the Departments of Zoology and Applied Entomology, Imperial College, London, and the Department of Parasitology, Liverpool School of Tropical Medicine, United Kingdom, studied malaria parasites of the orang-utan (*Pongo pygmaeus*) and discovered a new species of parasite, *P. (Plasmodium) silvaticum* sp. nov.⁹

2.13 In respect of the application of radiobiological techniques in the preparation of methods of immuni-

¹ Bull. Wld Hlth Org., 1972, 47, 357-374.

² Gutteridge, W. E. & Trigg, P. I. (1972) In: Van den Bosch, H., ed., *Comparative biochemistry of parasites*, New York, pp. 199-218.

³ Gutteridge, W. E. & Trigg, P. I. (1972) *J. Protozool.*, 19, 378-382.

⁴ Trigg, P. I. & Gutteridge, W. E. (1972) *Parasitology*, 65, 265-271.

⁵ Phillips, R. S. et al. (1972) *Parasitology*, 65, 525-535.

⁶ Wilson, R. J. M. & Voller, A. (1972) *Parasitology*, 64, 191-195.

⁷ Howells, R. E. & Davies, E. E. (1971) *Ann. trop. Med. Parasit.*, 65, 451-459.

⁸ Bafort, I. M. (1972) *Ann. Soc. belge. Méd. trop.*, 52, 235-236.

⁹ Garnham, P. C. C. et al. (1972) *Ann. trop. Med. Parasit.*, 66, 287-294.

zation against malaria, a consultation was held jointly by IAEA and WHO in June. A number of research proposals were explored, together with the possibility of further collaboration between the Agency and the Organization in respect of training and scientific meetings. At the Department of Preventive Medicine, New York University Medical Center, USA, where an *An. stephensi*/*P. cynomolgi bastianellii*/*Macaca mulatta* model has been used, the monkeys given intravenous inoculations of irradiated sporozoites showed ant sporozoite antibodies. The same department is also studying the various routes of immunization, methods of parasite attenuation and the development of protection against sporozoite-induced rodent malaria.^{1, 2} The demonstration of cross immunity between strains and variants of *P. knowlesi* by the Department of Chemical Pathology, Guy's Hospital Medical School, London, is encouraging in that it can be anticipated that malaria vaccines may have a wider spectrum of activity than previously thought.³ The department has also obtained pure preparations of viable extracellular merozoites.

2.14 A 13-month longitudinal study by the Institut Pasteur, Dakar, using the fluorescent antibody technique to detect changes of malaria antibody levels in infants 3-18 months old receiving regular prophylactic chloroquine, showed that while in the unprotected group there was a 50% increase in titre over the period, the titre of the protected group was reduced only by half. Clearly, antibody production was not completely suppressed by regular chemoprophylaxis. At the Institute of Hygiene and Scientific Research, Academy of Medical Sciences, Iași, Romania, the effect of radical treatment by chloroquine and primaquine on the evolution of antibody titres in 30 subjects has revealed no significant change in antibody levels after 6 months.

2.15 Studies in rats infected with *P. berghei* on their immunological responsiveness to sheep erythrocytes at the cellular and humoral levels were carried out jointly by the Laboratory of Parasitology, Istituto Superiore di Sanità, Rome, and the Institute of Immunobiology, Hôpital Broussais, Paris.⁴ At the Department of Zoology, King's College, University of London, investigations indicate that macrophages have little or no role in the initiation of immune response in malaria.

2.16 *Malaria epidemiology.* The development of malaria serodiagnostic techniques is now reaching the stage when they may be employed more generally as a routine procedure. The Department of Tropical Hygiene, London School of Hygiene and Tropical Medicine, has shown that the indirect fluorescent antibody test (IFAT), when used as a test in blood transfusion centres, may eliminate the risk of transfusion malaria, and thus permit the use of blood of about three-quarters of those who have lived or travelled in malarious areas, who have a negative IFAT.⁵ The same department is also using this test (with homologous antigen) on sera from Mauritius—where, following a successful malaria eradication programme, the whole country has been in the maintenance phase since 1968—to ascertain whether it can be used to check that there has been no recent re-establishment of the disease.

2.17 The Laboratory of Parasitology and Exotic Pathology, University of Grenoble, France, is completing its longitudinal study on the epidemiology of disappearing malaria in Tunisia in collaboration with the Government, using heterologous *P. cynomolgi bastianellii* antigen. The proportion of positive titres in over 2000 people tested at 6-month intervals with the IFAT in 18 localities in Tunisia has progressively decreased from 7.2% in April-May 1971 to 0.9% in April 1972. The same laboratory has developed a method for lyophilization of the malaria antigen which is now being tested in the field⁶ and, in collaboration with the London School of Hygiene and Tropical Medicine, has carefully assessed the considerable limitations in the use of *P. gallinaceum* antigen for the IFAT.⁷ The WHO Collaborating Laboratory for the Development of Malaria Serological Techniques, in cooperation with the WHO International Laboratory for Biological Standards, National Institute for Medical Research, London, has prepared a series of antisera samples of *P. falciparum*, *P. vivax* and *P. malariae* which can be issued in lyophilized form and which, after being subjected to tests, may serve as a standard.

2.18 Various aspects of the technique of the indirect haemagglutination test for malaria were studied at the Laboratory of Medical Parasitology, University of Nijmegen, Netherlands.⁸ The test has

¹ Nussenzweig, R. et al. (1972) *Amer. J. trop. Med.*, **21**, Part 2, 722-728.

² Spitalny, G. L. & Nussenzweig, R. (1972) *Proc. Helminth. Soc. Wash.* (in press).

³ Butcher, G. A. & Cohen, S. (1972) *Immunology*, **23**, 503-521.

⁴ Corradetti, A. et al (1972) *Ann. Inst. Pasteur*, **122**, 193-203.

⁵ Bruce-Chwatt, L. J. et al. (1972) *Lancet*, **1**, 512-515.

⁶ Ambrose-Thomas, P. et al. (1972) *Bull. Wld Hlth Org.*, **46**, 558-560.

⁷ Ambrose-Thomas, P. et al. (1972) *Bull. Wld Hlth Org.*, **46**, 856-861.

⁸ Meuwissen, J. H. E. T. et al. (1972) *Bull. Wld Hlth Org.*, **46**, 771-782.

been modified by the introduction of a stabilized carrier—a glutaraldehyde-fixed, tanned sheep cell—and stabilization of the suspensions of fixed sheep cells by lyophilization.¹ This modification should make it possible to use the test in field laboratories. Samples of the lyophilized cells are now being tested in five laboratories in three countries.

2.19 The WHO International Reference Centre for Maintenance and Distribution of Standardized Strains of *Anopheles*, Ross Institute of Tropical Hygiene, London, has defined a sixth species of the *Anopheles gambiae* complex—designated species D—recognized at present only from the Mongiro forest area in Uganda.² In studies of the cytogenetic divergencies in *Anopheles* species complexes, the Institute of Parasitology, Monticelli, Italy, noted that inversion polymorphism appeared to give rise to differences in timing in development, in that the adult carriers of two alternative gene arrangements in *An. stephensi* were found to have distinct daily distributions of emergence.³

2.20 Improved methods for the dissection of glands, stomachs, ovaries, etc. of preserved insects have been developed, using a special medium which permits detailed examination of entomological material several months after collection.⁴

2.21 In studies to assess the relative effectiveness of different mosquito sampling methods, particularly with a view to finding an alternative to the use of human "bait", the Office de la Recherche scientifique et technique outre-mer (ORSTOM), Centre Muraz, Bobo Dioulasso, Upper Volta, is testing the efficiency of different light traps.

2.22 For epidemiological studies and for the construction of mathematical models, knowledge of the age structure of the anopheline population is of considerable importance. A number of methods have been described for age determination, mainly relying on observation of changes of the female reproductive system. A newly described method of age grading that involves counting the layers of cuticle growth that form daily at different points of the exoskeleton of Diptera⁵ shows promise and could be valuable where accurate knowledge of the age of anopheline popu-

lations is important for malaria eradication. It is being developed for anophelines at the Imperial College Field Station, Ascot, United Kingdom.

2.23 At the same institute other studies are also being made, on the frequency with which *An. sacharovi* takes blood meals consecutively from two hosts of different genera and, as a guide to the prevalence of multiple feeding, on the methods of identifying different hosts of man by blood group substances. The host attraction for *An. gambiae* of man in respect of sex and age is being investigated by ORSTOM, Brazzaville. Studies on persistent transmission in the forest and forest fringe areas in Thailand by staff of the national malaria eradication programme indicate that, besides *An. balabacensis*, an associated species (*An. minimus*) has an exophilic and exophagic behaviour that contrasts with its normal endophilia and endophagia in the plain areas.

2.24 Observations on the behavioural reactions of *An. atroparvus* and other anophelines to residual insecticides, using a specially devised multiple-response apparatus, have been made at the Institute of Hygiene and Scientific Research, Academy of Medical Sciences, Iasi, Romania.⁶ Consequent upon the increased use in antimalaria operations of newer insecticides, and particularly the carbamate propoxur, the WHO International Reference Centre for Maintenance and Distribution of Standardized Strains of *Anopheles*, London, is redefining the discriminating dosages used in the standard tests of susceptibility of anophelines to these insecticides.

2.25 *Chemotherapy of malaria and drug resistance.* Activities in connexion with the synthesis of new potential antimalarial compounds have been pursued by the Marcinovskij Institute of Medical Parasitology and Tropical Medicine, Moscow. The Department of Chemistry, Institute of Technology, Warsaw, developed a series of diphenylsulfone derivatives and, in collaboration with the WHO Reference Centre for Screening of Potential Malaria Compounds, Department of Parasitology, Liverpool School of Tropical Medicine, United Kingdom, demonstrated the extent to which nitro and sulfo groups attached to the base molecule affected antimalarial activity.⁷ The Institute in Warsaw is also synthesizing a series of sulfone and sulfonamide analogues of the pyrocatechol, RC 12, which was developed some years ago in the Federal Republic of Germany and is now being tried in man, following tests on monkeys.⁸ The Institute of Applied Chemistry

¹ Meuwissen, J. H. E. T. & Leeuwenberg, A. D. E. M. (1972) *Trans. roy. Soc. trop. Med. Hyg.*, **66**, 666-667.

² Davidson, G. & White, G. B. (1972) *Trans. roy. Soc. trop. Med. Hyg.*, **66**, 531-532.

³ Coluzzi, M. (1972) *Science*, **176**, 59-60.

⁴ Ungureanu, E. (1972) *Bull. Wld Hlth Org.*, **47**, 239-244.

⁵ Schlein, J. & Gratz, N. G. (1972) *Bull. Wld Hlth Org.*, **47**, 71-74.

⁶ Gheorghiu, T., Ungureanu, E. M. & Garrett-Jones, C. (1972) *Bull. Wld Hlth Org.*, **46**, 122-126.

⁷ Peters, W. et al. (1972) *J. med. Chem.*, **15**, 204-206.

⁸ Sodeman, T. et al. (1972) *Bull. Wld Hlth Org.*, **47**, 425-428.

of the University of Erlangen, Federal Republic of Germany, is pursuing studies on the 6-aminoquinoline group¹ and has developed a standard method for the assessment of the prophylactic activity of antimalarials, using *P. berghei yoelii*.² The Laboratory of Protozoology, University of Tübingen, Federal Republic of Germany, tested samples of five new antibiotics received from the Biological Institute of the Slovak Academy of Science, Bratislava, Czechoslovakia, for their antimalarial activity.

2.26 An *in vitro* method of screening compounds for potential antiplasmodial activity is being developed at the Institute of Animal Physiology, Babraham, United Kingdom; the test depends on the inhibition of the haemolytic effect of 11-octadecanoic acid ("cis-vaccenic acid"). Using their system of *P. berghei* parasites released from their reticulocytic host cells, investigators at the Department of Pharmacology, West Virginia University Medical Center, USA, have made a number of observations on the drug sensitivity of the system's nucleic acid anabolism,³ and the model may be of value in drug screening.

2.27 A number of studies are being made on the development of resistance to chloroquine in malaria parasites. Investigations at the Department of Parasitology, Liverpool School of Tropical Medicine, United Kingdom, have indicated that chloroquine is initially concentrated in parasitized red cells by a simple physicochemical process and that resistance is associated with a switch in respiratory pathways.^{4,5} Work on binding sites carried out at the Department of Internal Medicine, St. Louis University, Mo., USA, using ¹⁴C-labelled drugs, has demonstrated that, whereas much less chloroquine is bound by red cells infected with chloroquine-resistant *P. berghei* than by cells infected with a chloroquine-susceptible strain of this parasite, little difference is observed in the binding capacity of the two strains when amodiaquine is used. Differences in the metabolism of amodiaquine and chloroquine have also been observed in the erythrocytes of *Aotus* monkeys infected with chloroquine-resistant *P. falciparum*. These findings may account for the relatively superior action of amodiaquine against certain chloroquine-resistant strains of *P. falciparum* in *Aotus* reported by the Southern Research Institute, Birmingham, Ala., USA.

2.28 Using the *in vitro* method for detecting resistance of *P. falciparum* to chloroquine previously tested in Brazil,⁶ a WHO-supported assessment was made of the sensitivity of this parasite in populations in Kenya and Nigeria. The method proved useful under field conditions, though care had to be taken in interpreting the results owing to the high frequency of *P. malariae*. No evidence of chloroquine resistance was detected during this limited survey.

2.29 A field trial was undertaken by the Parasitology Section of the Organization for Coordination and Cooperation in the Control of Major Endemic Diseases (OCCGE), Centre Muraz, Bobo Dioulasso, Upper Volta, to compare the effect of a single dose of a drug association of sulfalene and pyrimethamine with that of chloroquine in partially immune patients suffering from falciparum malaria. In adults and in children both treatments produced complete clearance of parasitaemia and a normal temperature within 48-72 hours of administration.

2.30 *Methodology of control.* In the WHO research project on the epidemiology and control of malaria in the African savanna which is being conducted in close cooperation with the Nigerian Government, the baseline data collection and analysis were completed (see also paragraph 12.21). Following field trials of the most appropriate type and dosage of drugs and of the effectiveness of the residual insecticide being used (propoxur), the project has now progressed to the operational phase, in which the results obtained in areas where malaria control measures are being applied will be compared with the data collected in areas not subject to antimalaria measures. The results will be assessed in terms of vector mosquito prevalence, parasite types, incidence and density, immunological response, and demographic and physical data of the human populations in the area. The analysis of the data is carried out through a computerized programme as they become available. Five students from countries in Africa and Europe have been attached to the research team for on-the-job training for periods of 8-9 weeks.

2.31 An assessment of the use of acridine orange staining of blood films to facilitate the demonstration of low density parasitaemias, by the International Malaria Eradication Training Centre in Manila, indicated that the staining procedures were simple and rapid and well within the competence of an average laboratory technician. Although infections with

¹ Nickel, P. & Fink, E. (1972) *Arch. Pharm.*, **305**, 442-448.

² Fink, E. (1972) *Z. Tropenmed. Parasit.*, **23**, 35-47.

³ Lantz, C. H. & Van Dyke, K. (1972) *Biochem. Pharmacol.*, **21**, 891-894.

⁴ Homewood, C. A. et al. (1972) *Nature (Lond.)*, **235**, 50-52.

⁵ Homewood, C. A. et al. (1972) *Trans. roy. Soc. trop. Med. Hyg.*, **66**, 2-3.

⁶ Rieckmann, K. H. & López Antuñano, F. J. (1971) *Bull. Wld Hlth Org.*, **45**, 157-167.

P. vivax and gametocytes of *P. falciparum* were detected more easily than by the standard Giemsa technique, it was at least as difficult to detect low parasite counts of young trophozoites of *P. falciparum*. Hence this method does not seem to have any advantage that would justify its more general use.

Meetings and coordination

2.32 In October-November an international malaria conference was held in Brazzaville for countries where time-limited malaria eradication is impracticable at present. The various antimalaria measures available, the administrative and financial feasibility of employing what are operationally the methods of choice, and the factors to be considered in order to select the appropriate method for each situation were discussed. The importance of evaluation and the need to develop methods for assessing the socioeconomic benefits of antimalaria measures were emphasized. Discussions also took place on the organization of the antimalaria programme within the general health service, and on training, health education and research. The role of WHO in such programmes and the need to coordinate international assistance were reconsidered.

2.33 A WHO Scientific Group on the Chemotherapy of Malaria that met in Geneva in October reviewed current practices in respect of drug administration and emphasized the importance of follow-up treatment after cure of the acute attack to mitigate recrudescences and relapses. Recent progress in antimalaria drug research and results of clinical and field trials of antimalarials were reviewed and the more extended use of some of these was proposed. Discussion took place on the spectrum of response of the malaria infection to drugs, on the procedures for assessing drug responses, and on measures which may be taken in areas of established drug resistance. Recommendations were made on the treatment schedules to be followed for malaria infections; and on research priorities in respect of the dynamics of drug resistance, the development of antimalarial compounds, and the screening of these compounds.

2.34 A joint WHO/UNICEF/USAID/United States Public Health Service coordination meeting on malaria took place in Geneva in May. This was the thirteenth in a series of such meetings that have been held over the years. Following a review of the status of the programme, the causes of the difficulties met in implementing the recommendations of strategy review teams and the methods of overcoming those difficulties were discussed. The various policies of assistance in the field of malaria, including assistance to research

and training, and the means of coordinating this assistance, were examined.

2.35 UNDP assisted 10 antimalaria programmes during the year—three in the Region of the Americas, four in the Eastern Mediterranean and three in the Western Pacific Regions. UNICEF furnished supplies for 12 malaria eradication programmes in the Americas and for three in the Eastern Mediterranean Region. In addition, both UNDP and UNICEF, through their assistance to three and five projects respectively for the development of basic health services in Africa, contributed to malaria control activities in that Region. Bilateral assistance for malaria eradication programmes was provided by the Federal Republic of Germany in the form of insecticide supplies to six countries in the American Region; by the Union of Soviet Socialist Republics through advisory services and provision of supplies to one country in the Eastern Mediterranean Region; and by the United States of America (USAID) through advisory services, grants and loans, to eight countries in the Region of the Americas, one in the South-East Asia, two in the Eastern Mediterranean and three in the Western Pacific Regions. The World Food Programme maintained its assistance to the malaria eradication programme in Turkey by which surveillance workers are provided with food supplements, to workers in Indonesia in an antimalaria project, and to certain families in Tunisia during serodiagnostic surveys (see paragraph 2.17).

2.36 Intercountry malaria meetings organized or sponsored by the Organization included those between the following groups of countries: Argentina, Bolivia and Paraguay; Brazil and Paraguay; Colombia and Ecuador; Colombia and Venezuela; India and Bangladesh; India and Nepal; Iraq, Jordan, Lebanon, Syrian Arab Republic and Turkey; Peru and Colombia; and Peru and Ecuador. In addition the working group of Ministers of Health and directors of malaria eradication programmes of countries of Central America and Panama met at Panama.

Other parasitic diseases

2.37 Improved methods and means for attacking the more important parasitic diseases have been developed in recent years and it has now become technically feasible to control certain of them at reasonable cost. Better drugs for treatment of schistosomiasis and intestinal worm infections have been discovered, the systematic use of chemotherapy has proved effective in controlling certain intestinal

helminth infections and filariasis, knowledge of vectors has increased, and vector control techniques have become more efficient.

2.38 An urgent need exists, however, to fill gaps in our knowledge of the public health importance and the social and economic cost of parasitic diseases. It is known that parasitic infections can cause serious illness, sometimes leading to severe disability or death, but there is a lack of convincing or even useful data on their prevalence and severity throughout the community or the nation. Only when the prevalence of parasitic infections in whole communities can be measured in objective terms, their intensity in the various age and social groups determined and the amount of illness attributable to them assessed, will it be possible to estimate the true price that a community pays for its parasites.

2.39 Although parasitic infections can obviously render a person less useful to his family and to his community, the overall social and economic losses they represent have not been measured. Such losses, however, become evident when a water or land resources development scheme introduces important changes into a community and alters both its disease and living patterns. The consequent risk of increased illness from parasitic diseases and the new social problems thus created may interfere with the expected economic returns of the scheme. Therefore, both the impact of parasitic diseases in limiting economic development and social welfare, and the impact of socioeconomic development schemes on disease patterns, must be measured. To this end, special quantitative studies on onchocerciasis and its relation to the socioeconomic welfare of a large area of Africa are being sponsored by the Organization.

2.40 Public health authorities have on the whole been slow to apply the newer knowledge, materials and skills in well-planned, long-term programmes for the control of parasitic diseases. For example, ascariasis control programmes are rare although it has been clearly shown that *Ascaris* infection can be reduced through the systematic, large-scale use of cheap and safe drugs. Hookworm disease could also be enormously reduced by carefully planned and regular chemotherapy. Such programmes could be conducted by local health services.

2.41 Today, it may be expected that, if adequate use is made of existing knowledge and resources, parasitic diseases which have been allowed to propagate almost without check will come under a measure of control.

Schistosomiasis

2.42 Although schistosomiasis has declined in prevalence in Japan and a few other places, it is uncontrolled in most endemic areas and in some is spreading or increasing in importance due to migration of people or the development of water resources schemes. For example, in three villages on Lake Kainji in Nigeria the prevalence of the infection rose from 37% to 56% between 1970 and 1971. Similarly, in two villages on Lake Volta, Ghana, surveyed in 1970 the prevalence of infection in the children was 13% and 27%; one year later it was 78% in both villages. It is therefore essential that the changes in the prevalence and severity of schistosomiasis in man-made lakes should continue to be monitored. WHO specialists make regular visits to the lakes to measure the distribution and prevalence of infection and to study factors affecting the transmission of the disease.

2.43 As part of a WHO interregional project for field investigations on schistosomiasis, preliminary studies were made of the distribution and prevalence of the disease above and below the Aswan High Dam in Egypt. Schistosomiasis exists among the people in both areas and surveillance must continue to detect any increase in the disease as settlements grow and irrigation projects are developed and to allow any remedial action that may be necessary to be taken in good time.

2.44 The project for the study of schistosomiasis in man-made lakes, begun in 1971 with support from UNDP, has added to its staff at its headquarters in Accra and has installed a field laboratory at Anyaboni, Ghana, near Lake Volta. The aims of the project are to investigate the epidemiology and control of the disease in lakeside conditions, beginning with this large artificial lake, although other man-made lakes, including that created by the Aswan High Dam will also be studied. The control measures to be tested will include systematic large-scale chemotherapy. A new method of estimating parasite density will be tried out and the value and feasibility of using chemicals for snail control will be studied, having in mind the effect that chemicals used in the water may have on other aquatic organisms and the possibility of their accumulation in the food chain.

2.45 The snail recently discovered to be responsible for transmitting schistosomiasis at Khong Island in the Mekong river between Laos and the Khmer Republic can now be reared in the laboratory, thus making possible a more thorough study of the parasite and its transmission. Although the parasite is very similar to *Schistosoma japonicum* which is found else-

where in Asia and the Western Pacific area, the snail is different from those transmitting the infection elsewhere.

2.46 The WHO Expert Committee on Schistosomiasis Control which met in Geneva in July reviewed the status of knowledge of control techniques and studied reports and evaluations of a number of schistosomiasis programmes, some using chemotherapy alone, some mollusciciding alone and some a combination of methods. It concluded that the successes achieved showed clearly that with available knowledge and techniques it was possible to reduce the prevalence and the severity of the disease in many endemic foci. There is thus every reason to increase the number and scope of control programmes.

2.47 Reluctance to undertake a campaign against the disease may be due, in part, to lack of confidence that the results will be favourable. In some cases, the effectiveness of the measures taken has been misjudged because the objectives of the programme were not clearly conceived and realistic. It must also be emphasized that successful and economical control will be achieved only if a programme is continued systematically according to a long-term plan. The favourable results will then be cumulative, costs will be lower and a solid basis will be laid for development of an effective, dependable staff.

2.48 Many of the existing control programmes may be considered successful when judged realistically. In a project in Northern Ghana which WHO is continuing to assist, the systematic use of molluscicides in the dry season has significantly reduced transmission of infection. The programme costs US \$0.30 to 0.40 per person protected per year. Similarly in Brazil, in a field study that receives support from the Organization, molluscicide has been used regularly in the snail habitats. As part of a community self-help programme, the farmers apply the molluscicide under general technical supervision. The cost for chemical and equipment is about \$0.70 per person protected per year. In the third year of the project a few snails were found in habitats difficult to control but none of the snails was infected. The intensity of human infection fell substantially during the period of the study. In the WHO-assisted project in the Nile Delta, Egypt, a combined mollusciciding and surveillance programme started on new lines in July 1970 proved more effective than the previous scheme. The population density of both *Bulinus truncatus* and *Biomphalaria alexandrina* and the proportion infected were consistently and significantly lower. There was evidence of some interruption of transmission of *S. haematobium*. No

infected *Bulinus truncatus* were found in the area throughout two years of operation.

2.49 When snail control is supplemented by systematic large-scale chemotherapy the reduction in transmission is usually more rapid than when either is used alone. In a WHO-assisted project in the United Republic of Tanzania, when molluscicides were used alone the snail populations fell to a low level and the incidence declined significantly. When large-scale drug treatment was added to snail control the decline was much more rapid and the annual incidence in young children fell to about one half of that in the area where no control measure was used. In a *S. haematobium* area in Fayoum, Egypt, similarly encouraging results have been obtained by a combination of mollusciciding and chemotherapy. In Tunisia snail control with niclosamide, chemotherapy of infected patients, the search for new transmission foci and detection of cases in new localities are all undertaken together. In 1972 parasitological surveys were completed in most of the disease foci. A population estimated at 53 500 has already been protected against the risk of infection or reinfection.

2.50 The Organization has sought to make schistosomiasis control programmes more feasible and more successful by assisting in a variety of research activities. Since the discovery and development of new molluscicides is difficult and costly, WHO has encouraged field trials and research on new formulations of available molluscicides with a view to making them easier to use or more effective. Support for such work was given to several laboratories, including the Centre for Overseas Pest Research, London, and the Creative Biology Laboratory, Barberton, Ohio, USA. Studies were begun on the possible adverse effects on the environment of currently useful or promising molluscicides and on their possible accumulation in the aquatic food chain.

2.51 Another investigation undertaken concerned the possibility of controlling snails through the slow release of chemicals over a very long period. This procedure may be less harmful to other organisms, more economical, and adaptable for use in lakeside foci. Special slow-release formulations have been prepared and tried out both in the laboratory and in the field. Some chemicals that are active when used in this way against snails are also toxic to schistosome cercariae in the water.

2.52 Attempts are also being made to develop a substance that will be toxic to snails when they eat it. Such a compound might kill the snail hosts of schisto-

somes without endangering other animals in the water. The Organization has also sponsored investigations of the biology and life history of snails and of the mode of action of molluscicides.

2.53 To increase the number of persons qualified to carry out field investigations on snails and measures for snail destruction, the WHO Snail Identification Centre in Copenhagen presented a course on malacology for persons having responsibility in their countries for snail control or for research.

2.54 WHO continued to encourage the development and use of therapeutic drugs that are more effective and can be given in a short course of treatment or even in a single dose. It is consequently becoming possible to consider large-scale chemotherapy as a means to reduce the intensity and prevalence of the disease in a population. It is generally believed, however, that drugs should rather serve to supplement other control measures such as destroying snails or reducing transmission by modifying the environment.

2.55 The possible long-term adverse effects of drugs is a matter of great concern to the Organization. Late in 1971 and again in June 1972, WHO convened groups of experts to review the available antischistosomal drugs.¹ Although the newer drugs were judged to be highly effective, it was recommended that the search for less toxic drugs should continue. It was also agreed that the occurrence of side reactions and the possibility of long-term adverse effects did not provide sufficient grounds for advocating withholding the available drugs from use at the present time. Continued study of all these drugs for their long-term effects was, however, considered necessary.

2.56 Drug treatment of infected persons living in endemic areas is often assumed to be of limited value because the treated person quickly becomes reinfected. To test the hypothesis that drug treatment of children before they develop the severe form of the disease might give them some measure of protection when they are exposed to reinfection, the Organization is supporting a research project in north-east Brazil carried out by an agreement with the Medical School of Mogi das Cruzes in São Paulo.

2.57 A better understanding of the nature and severity of the disease is also needed so that objective measurements can be made of its importance. WHO has supported a project undertaken in Nigeria by the University Medical School, Ibadan, to study the degree of illness and disability occurring in communities

where *S. haematobium* is endemic. Another study of the prevalence and severity of intestinal schistosomiasis is being made near Lake Tana, Ethiopia.

2.58 The development of mathematical models relating to schistosomiasis and its control can aid in understanding the epidemiology of the disease and in the choice of control measures. Support was given to a programme undertaken by Rumford River Laboratories, Foxboro, Mass., USA, to develop, calibrate, and verify a computer model of the schistosome cycle which could be used to evaluate costs and benefits for different schemes to reduce transmission of the infection.

2.59 A new and important addition to the pathology of schistosomiasis is the discovery that a large proportion of persons with severe hepatosplenic schistosomiasis have glomerulonephritis and glomerulosclerosis. WHO is assisting further investigations on the mechanism involved.

2.60 Recent studies on immune responses to schistosome infection have shown that the adult parasites become protected against the immune response because they acquire a coating of the host antigen and are therefore not "recognized" by the host. Nevertheless, the worms produce an antigenic stimulus that prevents or reduces infection of the host by additional parasites. This results in maintenance of infection but at a lower level than would otherwise occur. In a study supported by WHO different worm species and species crosses have been put into the same animal host to learn whether one may produce protection against the other. It has been shown, for example, that a species that is not pathogenic for man can protect monkeys against the more pathogenic *S. haematobium* and *S. mansoni*. Although such a form of immunization may prove not to be feasible in man, it could be applicable to domesticated animals; in any case the results represent an important advance towards understanding the immune process. A further development in schistosome immunity is the demonstration that delayed hypersensitivity is probably the cause of some of the more severe complications of the disease. Thus one immune response can increase the severity of the disease while another acts to decrease it.

Onchocerciasis

2.61 Onchocerciasis constitutes one of the foremost public health problems in parts of Africa and of America. The pathogenesis of its most important complication, ocular onchocerciasis, has remained obscure but considerable advances have been made in knowledge of the epidemiological and entomological

¹ *Bol. Ofic. sanit. panamer.* (English ed.), 1972, 6, 82-100.

aspects of the disease. The development of efficient vector control methods has made it possible to envisage large-scale control projects in endemic areas of West Africa.

2.62 Following the improvement of medical services in the remote rural areas where onchocerciasis is typically found, hitherto unknown endemic foci are being discovered. For instance, the existence in Yemen of an endemic focus of onchocerciasis, transmitted by *Simulium*, was confirmed during the year.

2.63 In West Africa preparations are almost complete for the implementation of control operations in the Volta River basin. This is the largest onchocerciasis control project yet to be undertaken in Africa, and its success is a prerequisite for the economic development of the area concerned. The work of the preparatory assistance mission to governments¹ financed by UNDP and executed by WHO with the participation of FAO and the collaboration of IBRD was assessed at a review meeting held in Geneva in July and attended by representatives of the four agencies concerned. The meeting learnt that the prevalence of onchocerciasis in the Volta River project area, previously estimated at half a million cases, was probably twice as great. Although not all the determinants in the association between onchocerciasis and blindness are yet known, there is clear evidence that the earlier the age at which infection occurs and the heavier the infection during childhood, the greater the probability that blindness will develop. The meeting also recognized the fact that the distribution of endemic onchocerciasis extends beyond the limit of the present project area but agreed that further expansion of activities should be delayed until the currently planned project had demonstrated the feasibility of large-scale control of the disease.

2.64 The preparatory assistance mission prepared a work plan for onchocerciasis control in the project zone involving three major tasks: the collection and analysis of available data on the entomological and epidemiological aspects of the disease, research on the distribution and behaviour of the vector (*Simulium damnosum*) to obtain baseline data for the control operations, and research on the best methods of systematic aerial application to vector breeding sites of suitably formulated insecticides (see paragraph 3.21).

2.65 An interagency steering committee was established to ensure coordination of the action to be undertaken by each of the four agencies concerned in

the Volta River project. The committee discussed the mobilization of enlarged support for the control of onchocerciasis and the concomitant development of the reclaimed areas, and the operational research studies to be completed in 1973, including geographical reconnaissance of breeding sites, surveys of onchocerciasis prevalence, aerial spraying trials, effects of larviciding on aquatic life, and the use of chemotherapy as an adjunct to vector control operations. Studies of the economic development potential of the area were entrusted to FAO with assistance from IBRD.

2.66 In connexion with the contemplated use of chemotherapy, an informal consultation on the use of drugs in onchocerciasis control campaigns was held to define the conditions for carrying out controlled trials based on standard protocols. At present only two drugs are available: diethylcarbamazine, which is mainly effective against microfilariae, and suramin, which is the only curative drug known so far. Both have toxic side-effects and this has, up to now, limited their use. The Organization therefore continued to stimulate and support laboratory and clinical work in this field of pharmaceutical research. One new and effective compound has been developed and work is proceeding on formulations that would reduce unwanted reactions.

2.67 The Organization also supported several studies on the clinical and epidemiological aspects of onchocerciasis. In the Mount Elgon area of Uganda and in Yemen, the clinical picture was found to differ to some extent from the classical pattern in central and West Africa, as regards eye lesions, skin manifestations, and involvement of lymph nodes. An investigation was undertaken of the geographical differences in the types of skin lesions caused by *Onchocerca volvulus* in Guatemala, in the forest and savanna regions of Cameroon, and in Yemen. In WHO-supported studies on microfilariuria conducted in north-east Cameroon by the Geographic Epidemiology Unit of Johns Hopkins University, Baltimore, Md., USA, the most recent findings confirm that microfilariuria is a frequent clinical manifestation of onchocerciasis, at least in the African savanna; the condition should therefore be included in clinical study protocols for this disease. The same unit carried out systematic studies of immunoglobulin patterns in five communities in Chad where onchocerciasis is endemic. It was found that severe holoendemic onchocerciasis produced excessive elevations of IgG and IgM but a relative deficiency of IgD. In Upper Volta the parasitology section of the Centre Muraz, Bobo Dioulasso, initiated an epidemiological study of onchocerciasis in different biotopes according to

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 2.64.

standardized methods; this is to be accompanied by a research project on the micro- and macro-filaricidal effect of new, nontoxic chemotherapeutic compounds.

2.68 In experimental studies supported by the Organization and carried out by the Helminthiasis Research Unit, United Kingdom Medical Research Council, Kumba, Cameroon, a comparison was made of the lesions produced in the rabbit eye by microfilariae from the Cameroon forest and by Sudan-type savanna strains of *O. volvulus*. It was found that the latter strains were intrinsically more invasive and pathogenic in the rabbit cornea than was the former. These results link up with the findings of a survey made in Cameroon by the same unit, showing the frequent occurrence of severe onchocercal sclerosing keratitis in the Sudan-type savanna zone and its rarity in the forest zone, despite the fact that microfilariae were often seen in the cornea of infected persons in both zones. The concordance of these experimental and survey results provides firmer evidence to support the suggestion that the parasite strain is an important factor governing the prevalence of onchocercal blindness.

2.69 Experimental research on various aspects of onchocerciasis control has long been hampered by the lack of a laboratory model in which the complete cycle of transmission from vector to definitive host to vector again could be maintained. In 1972 a major breakthrough was achieved when for the first time an African simuliid, the Kibwezi form of *S. damnosum* (of unknown vector potential) was induced to mate, blood-feed and lay viable eggs in the laboratory. The techniques still need to be refined, however, before a successful colony can be established. In similar experiments with *S. damnosum* (Sanje form), *S. adersi* and *S. bovis*, only the latter mated in captivity. This WHO-supported investigation, in which a quite simple apparatus was used, was made possible by the collaborative efforts of scientists from the Department of Entomology, Institute of Tropical Medicine, Tübingen, Federal Republic of Germany, and from the East African Institute of Malaria and Vector-borne Diseases, Amani, United Republic of Tanzania.

2.70 In work supported by WHO at the Laboratory of Zoology, National Museum of Natural History, Paris, preliminary observations suggested that the vector-parasite relationship between *S. ochraceum* from Guatemala and *O. volvulus* was quite different from that observed in studies of *S. damnosum* from the African savanna. In the former vector the number of microfilariae reaching the haemocoel appeared to be proportional to the number ingested, whereas in the latter no such relation was noted. In the studies of the cytotaxonomy of the *Simulium*

(*Edwardsellum*) *damnosum* complex undertaken by the University of Western Ontario, London, Canada, further material from both West and East Africa was collected and examined. Work pursued at the University of Alberta, Canada, on the feeding behaviour of *Simulium* larvae is of particular interest since they tend to ingest floating debris, and small concentrations of insecticide (particulate or adsorbed on solid particles) could therefore give the effect of a selective stomach poison.

2.71 In studies on the hydrochemical and hydro-physical conditions affecting the aquatic stages of *S. damnosum*, scientists from the Institute of Tropical Medicine, Tübingen, Federal Republic of Germany, investigated watercourses in Cameroon in order to assess the environmental factors affecting the development of the larvae. The values obtained were compared with those recorded in 1969 in savanna areas of Upper Volta and the tropical rain forest of Liberia. Differences were found in several factors such as pH, silicate, phosphate, total hardness and conductivity, indicating that different cytotaxonomic populations of *S. damnosum* may prefer breeding sites with different chemical conditions. However, nitrogen compounds, sulfate and other important factors were recorded within a similar range at all breeding places surveyed in the three countries.

2.72 The Organization assisted certain practical studies that might directly benefit the proposed project in the Volta River basin. These related to the testing of new trapping devices for *S. damnosum* and investigations of its biting habits and attraction to different odours, shapes, sizes and colours. Geographical reconnaissance of *S. damnosum* distribution was continued, partly from the air for typical breeding sites and also by a detailed ground survey in an endemic area north-east of Lake Volta, where no previous entomological survey had been made.

Filariasis

2.73 Knowledge about the epidemiology of filariasis is accumulating and bringing added evidence of the wide prevalence of this disease, its severity and its significance to man in many parts of the world. The success of filariasis control programmes in limited areas where conditions favour them gives grounds for the hope that programmes on a wider scale may achieve similar results. However, the disease remains uncontrolled in many areas.

2.74 In a filariasis survey in Mali supported by WHO and carried out by workers from the Organization for Coordination and Cooperation in the Control

of Major Endemic Diseases (OCCGE), Centre Muraz, Bobo Dioulasso, blood examinations for microfilariae indicated the presence of infection with *W. bancrofti* in up to 22% of the inhabitants of some villages; it was observed that hydrocoele was relatively frequent. Vector studies showed that the main vectors in rural areas were anopheline mosquitos and that *C. fatigans* is the most dangerous vector in urban areas. The expected development of irrigation schemes in that country will increase rural anopheline breeding and may result in a corresponding increase in the prevalence of filariasis.

2.75 In the United Republic of Tanzania a study was made of the biting habits of mosquitos in relation to transmission of filarial infection. In other WHO-supported work, special attention was given to studies of the parasite in the insect host. In particular, such matters as carbohydrate metabolism, migration of the worms and their survival in insects of differing susceptibilities to infection were investigated at the Liverpool School of Tropical Medicine, United Kingdom. In one series of studies on the genetics of mosquito susceptibility, a mosquito strain receptive to *Brugia* infection is being compared with a refractory anopheline strain.

2.76 From its base at Tonga, the WHO interregional programme of field investigations on filariasis continued its study on the *Aedes scutellaris* species complex, vectors of subperiodic filariasis in the South Pacific area.

2.77 Work in the Comoro Islands and Madagascar appears to have disproved the hypothesis that *W. vauceli* was a species separate from *W. bancrofti*; another investigation carried out with the cooperation of the WHO International Reference Centre for Filarioidea, London, has resulted in considerable advances in knowledge of the filaria vectors in this area.

2.78 The classical method of diagnosis by examination of a stained thick smear of blood, which usually has to be taken from the patient at night, for the presence of microfilariae, misses a considerable proportion of infections, particularly the low-density infections that are of increasing importance during control campaigns. WHO-assisted trials are being carried out in the Pacific area to refine two recently developed methods of detecting microfilariae in the blood. One is a counting chamber technique; the other, the more sensitive, is a membrane filtration technique.¹ Experiments are proceeding in France, India and Japan on the use of a fluorescent antibody

technique to diagnose filariasis without needing to collect blood from human beings during the night. New antigens have been prepared in Japan and France but unfortunately they are still extracted from filariae, such as *Dirofilaria immitis* and *Dipetalonema witei*, taken from laboratory animals. In a trial in India, measured blood samples were dried on filter-paper and successfully tested by the fluorescent antibody technique up to 4 months later. The test was positive in 23% of cases examined as compared with 4% detected by examination of blood films from the same endemic area. A prevalence survey, using the same technique, is in progress in the Comoro Islands, where an earlier blood-film survey on Mayotte Island indicated a prevalence of 45% in the population over 1 year of age. At the Department of Parasitology, London School of Hygiene and Tropical Medicine, United Kingdom, the fluorescent antibody test was used in connexion with experimental infections of *B. pahangi* in cats. Antibodies to adult-worm antigens appeared about three weeks after infection and reached a peak when the animal hosts had circulating microfilariae. However, antibodies to microfilaria antigens could not be detected except in those cats subjected to repeated infections and then only when they had become amicrofilaraemic and showed signs of elephantiasis. These results parallel findings on the course of infection in man.

2.79 The control of *W. bancrofti* and *B. malayi* can be attempted by mass chemotherapy (for which the only drug suitable is still diethylcarbamazine), by mosquito control, or by a combination of the two. Mass chemotherapy campaigns have given good and sometimes excellent results in certain Pacific islands. In Western Samoa, since the first round of mass drug administration in 1965-66, only three vector mosquitos out of 5662 captured and examined were found to be in an infective state; this is a clear manifestation of the dramatic decline in the human parasite reservoir. A second round of mass drug administration was completed during 1972. Work for the surveillance and control of filariasis is also being carried out in the Gilbert and Ellice Islands and in Niue.

2.80 Experimental work on drug development is handicapped by the fact that most filaria parasites of man do not infect laboratory animals. Animal filariae that can be maintained in the laboratory are not completely satisfactory and the search for more useful models continues. Recently workers at a WHO-supported laboratory in Paris have called attention to the possibility of using as a laboratory model a filaria of marsupials that is transmitted by *Aedes* and *Culex*.

¹ See also *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 2.82.

2.81 In the Federal Republic of Germany, WHO-supported investigations on the two drugs currently available for use against filariasis showed that suramin, known to be a curative macrofilaricide, is also suppressive but not a true prophylactic against laboratory infections. Careful studies of the blood picture in animals treated with either suramin or diethylcarbamazine confirmed, what was already known, that the strong physiological reactions observed after treatment may be caused in part by the death of the parasites, but also indicated that the drugs themselves may play a considerable role in the host reactions.

2.82 A programme of assistance to research continued at the WHO International Reference Centre for Filarioidea at the London School of Hygiene and Tropical Medicine. The Centre's collection of filariae was increased and now numbers over 6000 specimens; the Centre also maintains the complete life-cycles of the following species: *Brugia malayi*, *B. pahangi*, *Dirofilaria immitis*, *Dipetalonema witei*, *Litomosoides carinii*, *Onchocerca cervicalis*. In addition, *Onchocerca volvulus* and *Dipetalonema vanhoofi* infections are maintained in chimpanzees.

2.83 With the help of WHO, the International Filariasis Association has prepared an up-to-date review of existing knowledge of the distribution of filariasis for circulation to interested workers.

Trypanosomiasis

2.84 The incidence of sleeping sickness seems once more to be on the increase in some parts of East Africa, while in West and central Africa endemic foci are still smouldering. In Busoga, Uganda, where the disease was in regression for some years, the number of patients has recently grown considerably. A recurrence of human trypanosomiasis was reported also in western Ethiopia. In Zaire, the areas involved seem to be expanding although the incidence of the disease has been reduced by the use of mobile teams to detect cases and treat infected persons. In view of the unusually acute clinical picture observed in Maniema, Eastern Zaire, it was thought possible that infections with *Trypanosoma rhodesiense* would be found. On the basis of experiments in laboratory animals, the more likely explanation now seems to be that particularly virulent variants of *T. gambiense* strains do occur. The reactivation of foci may be due either to reinfection from a persistent reservoir or to the frequent migration of populations. The surveillance of African trypanosomiasis was discussed in some detail in the *Weekly Epidemiological Record*.¹

2.85 The risk of an increase in sleeping sickness may be heightened by the creation of man-made lakes involving population movements and changes in the ecological situation. In such cases it is advisable to screen the population at regular intervals for at least two or three years using up-to-date diagnostic techniques.

2.86 A team composed of scientists from the United Republic of Tanzania, the Swiss Tropical Institute and the WHO International Reference Centre for Trypanosomiasis at the East African Trypanosomiasis Research Organization, Tororo, Uganda, investigated the epidemiological situation in an African game reserve. Their conclusion was that tourist visits could safely be made provided that visitors were informed of the need to consult a specialist in tropical medicine early if they developed a fever. The team found evidence suggesting that hyena, lion, waterbuck and hartebeest may act as reservoir hosts of *T. rhodesiense*.

2.87 A growing difficulty in the chemotherapy of trypanosomiasis is the occurrence of drug-resistant strains. New drugs, especially those active on central nervous system infection, are required. Perhaps because of low expectations of the possible commercial returns, the search for antitrypanosomal compounds is concentrated in the universities rather than in the pharmaceutical industry. New compounds developed at the University of Erlangen, Federal Republic of Germany, were given preliminary trials on animals at the WHO International Reference Centre, Tororo. One compound was found to be highly active against trypanosomes of the *T. brucei* complex, but appeared not to reach the central nervous system. Fundamental research on the action of drugs against trypanosomiasis is being pursued in combination with the DNA studies mentioned in paragraph 2.91.

2.88 Drug sensitivity estimations on the *T. gambiense* strains isolated in 1971 from patients in Zaire were carried out by the Veterinary Faculty of the University of Utrecht, Netherlands. Epidemiological information obtained from this work may have implications for current treatment regimes.

2.89 In the absence of an effective prophylactic method against trypanosomiasis, it is particularly important to develop diagnostic techniques suitable for use in the field. The School of Public Health, Brussels, with WHO support, has developed an indirect haemagglutination technique (IHA) for detecting trypanosome infections. Lyophilized erythrocytes are used and the test can be simplified for field use. This brings the number of available serological

¹ *Wkly epidem. Rec.*, 1972, 47, 237-245.

methods for diagnosing trypanosomiasis to five: complement-fixation, immunofluorescence, IgM, latex agglutination and IHA. These tests must now be compared using identical serum material. After further experience with the haematocrit centrifugation technique for detecting the parasite in the blood, workers at the WHO International Reference Centre have confirmed its value; the method seems to deserve more widespread application.

2.90 Information on the latest developments in both fundamental and applied research was presented at the joint FAO/WHO seminar on trypanosomiasis organized in Kinshasa in October and attended by 20 nominees of the governments of various African countries with trypanosomiasis programmes. The seminar provided an opportunity to analyse recent epidemiological data brought together from all over Africa.

2.91 In recent years, interest in research on *Trypanosoma* has been growing among scientists who are primarily interested in fundamental problems, for instance, those of cell biology. These workers are attracted by the suitable experimental model provided by *Trypanosoma*, which are relatively simple organisms with highly sophisticated properties, and their investigations have already led to advances both in chemotherapy and in methods for taxonomic identification. WHO-assisted studies on kinetoplast DNA, for instance, are continuing at the Animal Morphology Laboratory of the Université Libre de Bruxelles, Belgium, the Molecular Pharmacology Unit, Institut Gustave Roussy, Villejuif, France, and the University of Kent, Canterbury, United Kingdom, in collaboration with the Biochemical Laboratory of Amsterdam, and the Molteno Institute of Biology and Parasitology, Cambridge, United Kingdom. During the year various laboratories in Belgium, the Netherlands and the United Kingdom were working together on African trypanosomiasis and others in France and the United Kingdom on American trypanosomiasis.

2.92 For the differentiation of morphologically identical subspecies or variants and their identification as *T. brucei*, *T. gambiense* or *T. rhodesiense*, two new methods are being investigated in addition to the blood incubation infectivity test that was developed in the course of the WHO/UNDP project in Kenya.¹ The first method is simple to perform and is based upon the principle that the kinetoplast DNA of each subspecies of the *T. brucei* complex has its characteristic base sequence which is reflected in the com-

position of the complementary RNA. By preparing purified radioactive RNA material specific for each species it is possible to identify trypanosomes even as single organisms on an object slide. The second method was developed at the University of Edinburgh and consists of a modification of the immunofluorescence technique. Morphologically identical trypanosomes can be differentiated by measurement of differences in titre when tested with antisera, each specific for a subspecies or variant of the *T. brucei* complex. Although this method would be less convenient in the field, it may be useful for evaluation studies of the two other methods mentioned above. At the Nigerian Institute of Trypanosomiasis Research in Kaduna and at the London School of Hygiene and Tropical Medicine, United Kingdom, work has started to standardize and evaluate the blood incubation infectivity test.

2.93 To explore the possibility of developing a radiation-attenuated vaccine against African trypanosomiasis, an informal meeting of experts was arranged in May in collaboration with IAEA. The objectives were to coordinate and evaluate present research on immunity in trypanosomiasis. Recommendations were made for a programme in both applied and fundamental research.

2.94 Experimental studies of the pathogenetic role of kinins and on histopathology were carried out at the Imperial College Field Station, Surrey, United Kingdom, to follow up clinical studies on the occurrence of Herxheimer reaction during the treatment of human cases of trypanosomiasis. A programme of animal experiments was combined with the studies on the pathogenesis. At the London School of Hygiene and Tropical Medicine, studies continued on the biochemical constitution and processes of development of *T. (Trypanozoon) brucei* in invertebrate hosts. Cell-transferred-immunity experiments were performed in Israel at the Hebrew University. Cell-transferred immunity was not demonstrated in *T. lewisi* infections. However, interesting observations regarding plasma cells and haematopoietic cells were made. The latter cells cluster around reticuloendothelial cells, establishing a close relationship between the cells (pinocytosis). The well known phenomenon of adherence of trypanosomes to erythrocytes might be connected with this observation; a similar process has been reported to occur in baboons infected with *Plasmodium*.

2.95 Freshly isolated *T. gambiense* material is now needed for many research programmes. To ensure sufficient supplies, permanent arrangements were made with the Bureau central de la Trypanosomiase in Zaire for the isolation of organisms on a routine basis,

¹ Rickman, L. R. & Robson, J. (1970) *Bull. Wld Hlth Org.*, **42**, 650-651, 911-916.

their preservation and distribution. The collection of stabilates will become available for distribution to interested research workers, including the WHO International Reference Centre for Trypanosomiasis in Tororo, Uganda. That Centre has further expanded its collection of *Trypanosoma* stabilates, and has supplied research centres all over the world with documented material.

2.96 Fly colonies are a prerequisite for much research work on methods of tsetse control. WHO therefore began to collect information in a standardized form on the progress, performance, and productivity of the existing colonies of various species of tsetse with a view to promoting the exchange of data on methods and results.

2.97 In the Region of the Americas, the Organization continued to support a collaborative project involving seven laboratories in six countries for the selection and evaluation of better diagnostic antigens for the Chagas' disease complement-fixation test. Two antigens were found to be superior and further work is being done on their evaluation. In addition a positive serum pool consisting of a large number of aliquots was made available as a standard in the titration of diagnostic antigen lots. At the University of Kent, Canterbury, United Kingdom, a method of isolating the intracellular stages of *Trypanosoma cruzi* was developed and will provide a system for biochemical studies on intracellular trypanosomes. A programme on immunotaxonomic studies was started at the London School of Hygiene and Tropical Medicine.

2.98 Vector transmission studies were carried out in the University of Costa Rica. Observations on feeding preferences indicated that *Triatoma dimidiata* was more susceptible to infection than *T. infestans*, a conclusion that is in contrast with the results of experiments outside Costa Rica.

2.99 The literature on all aspects of Chagas' disease published between 1909, when the disease was discovered, and 1969 is included in a bibliography that was issued in May.¹ This is the outcome of some years of collaboration between the Organization, the United States Department of Agriculture, and the University of Maryland.

Leishmaniasis

2.100 An increase in the incidence of cutaneous leishmaniasis was reported from Afghanistan, the

Libyan Arab Republic and the Syrian Arab Republic; in West and central Africa new cases were described in Chad, Mali, Senegal and Upper Volta. Outbreaks of visceral leishmaniasis were reported from Iraq, Ethiopia, Kenya and Uganda. Reports of outbreaks of cutaneous leishmaniasis, however, do not always reflect a new epidemiological situation since often what is at first regarded as a new epidemic is merely the occurrence of some spectacular cases that have drawn attention to the problem.

2.101 Reports from Brazil, Iran, Panama and the USSR have confirmed the zoonotic character of both cutaneous and mucocutaneous leishmaniasis.

2.102 In the interests of a better understanding of the epidemiological, diagnostic or chemotherapeutic aspects of the disease, the Organization supported research on the differentiation and identification of *Leishmania* species and strains. At the Gamaleja Institute of Epidemiology and Microbiology, Moscow, a method of species differentiation using ferritin-labelled antibodies has proved its usefulness. Its application, however, requires a well equipped and well staffed laboratory. As a result of investigation of the DNA base composition of *Leishmania* strains and species, workers at the Liverpool School of Tropical Medicine, United Kingdom, found a clear distinction between *Leishmania tropica major* and *L. tropica minor* in terms of kinetoplast DNA; this confirms the clinical and immunological differences between these two strains. Other findings were that *L. donovani*, the causative organism of visceral leishmaniasis, can be distinguished in terms of its kinetoplast DNA from strains giving rise to cutaneous leishmaniasis and that a strain isolated from a patient suffering from diffuse cutaneous leishmaniasis differs slightly in its kinetoplast DNA base composition from a strain causing non-diffuse cutaneous leishmaniasis.

2.103 The collection, maintenance and identification of *Leishmania* strains were continued at the WHO International Reference Centre for Leishmaniasis, Department of Parasitology, Hadassah Medical School, Jerusalem. Strains from Ethiopia, India and Kenya were added to the Centre's collection and material was distributed to interested investigators throughout the world.

2.104 For *in vitro* studies on pathogenesis, therapy, and immunity in leishmaniasis, WHO assisted further efforts to develop a reliable experimental model using tissue culture techniques. The selection of suitable host cells for subinoculation of infected cultures and the prevention of bacterial contamination, especially

¹ Olivier, M. C., Olivier, L. J. & Segal, D. B. (1972) *A bibliography of Chagas' disease (1909-1969)*, Washington, D.C., US Department of Agriculture.

by *Mycoplasma*, were the most important problems encountered. At the WHO Research and Training Centre for Immunology, Lausanne, Switzerland, research in this field is particularly concerned with cell-mediated immunity and the mechanisms of phagocytosis (see paragraph 5.11), while at the Liverpool School of Tropical Medicine the mode of action of therapeutics is being studied and *in vitro* experiments with drugs carried out.

2.105 Investigations on humoral immunity, immuno-suppression and cell-mediated immunity were continued, with WHO assistance, at the Department of Microbiology, Pahlavi University, Shiraz, Iran. The mechanisms of immunity to cutaneous leishmaniasis have been brought into relation with histological changes of the regional lymph nodes. Growth inhibitory factors occurring in the serum of infected animals were discovered and investigations to determine their exact nature were begun.

Amoebiasis

2.106 Efforts to achieve better amoebiasis control were concentrated on the improvement and assessment of diagnostic techniques. The indirect immunofluorescence technique was more generally applied in both African and European research centres. At the National University of Zaire, Kinshasa, a large number of serum samples were screened, with a negligible incidence of false positive reactions. Reports of work undertaken at the University of Grenoble, France, the Tropical Institute, Basle, Switzerland, and the Royal Free Hospital, London, indicated that the current serological tests, applying the techniques of indirect immunofluorescence, indirect haemagglutination and latex agglutination, were useful for diagnosing amoebic hepatitis. However, intestinal amoebiasis in its chronic or acute form cannot be detected by serological methods. Indirect immunofluorescence techniques were also found useful for the detection of amoebae in tissues on the basis of routine processed sections. This method has proved to be species-specific and is valuable for the diagnosis, even retrospectively, of primary amoebic meningoencephalitis.

2.107 Further experience gained with the chemotherapeutic compound, metronidazole, in Pakistan, the United Kingdom and elsewhere, has confirmed its considerable advantages for the control of amoebiasis.

2.108 Primary amoebic meningoencephalitis seems, in terms of world health problems, of limited importance. In the occasional outbreaks reported in recent years, from Australia, Belgium, Czechoslovakia,

New Zealand, the United Kingdom and the United States of America, it was found, however, that the major cause of extensive spread of the infection was delay in making the correct diagnosis. It is therefore important to improve diagnostic techniques and to disseminate information on this disease more widely.

Mycotic infections

2.109 The Government of Iran acted as host for an intercountry course on mycology techniques for laboratory technologists. This three-month course began in October at the Central Public Health and Reference Laboratory, Teheran; participants were selected from countries in the Eastern Mediterranean Region where facilities for such training are not yet available. Special emphasis was laid on training in diagnosis.

2.110 The Organization gave advice to Sudan on the laboratory diagnosis and therapy of mycetoma as part of a project to define the extent of the mycosis problem in the country and to stimulate the interest of medical and health officers in case-finding, diagnosis, treatment and control of mycoses.

2.111 In an area of Zaire where mycotic infections are endemic, sera were collected from random population samples and sent to the Prince Leopold Institute for Tropical Medicine, Antwerp, Belgium, and to the Center for Disease Control, Atlanta, Ga, USA, where they will be used in a WHO-supported evaluation of serological diagnostic procedures in systematic mycoses.

2.112 Two long-term investigations on the ecology and epidemiology of mycetoma agents and other fungi were pursued with WHO support by the Mycoses Service of the Institut Pasteur, Paris. In one project further field trips were made to Senegal and Mauritania to determine soil and plant reservoirs of infective forms, in particular *Madurella mycetomi* which was isolated for the first time from soil. In the other project, studies of *Nocardia* and *Sporotrichum schenkii* were continued in Central America.

Miscellaneous parasitic infections

2.113 Intestinal protozoa and helminths, under favourable circumstances for transmission, cause significant illness and give rise to serious public health problems. Support was continued for a long-term study undertaken by the New York University School of Medicine of the epidemiology of intestinal parasite infections in an institution for the mentally retarded where the number of variables influencing transmis-

sion is smaller than in normal situations but where conditions for transmission of some of the parasites is very favourable. For example, within 10 months of admission 48% of the children acquired *Giardia* infection. The three most common parasites were *Giardia*, *Hymenolepis* and *Strongyloides*. One finding was that the number of mixed parasite infections was smaller than would be expected. It is possible that, since the most common parasites all inhabit the duodenum, they may be in competition or may in some way inhibit each other.

2.114 A number of drugs for the treatment of intestinal helminth infections have been put forward

recently, and the Organization has completed a review of the status of such drugs. Data on the efficacy and suitability of both available and candidate drugs have been analysed and where possible a comparison has been made of their relative merits for the treatment of infection with individual parasite species. It appears that, in view of the progress already made in developing better and safer drugs, community-wide control programmes based on systematic repeated use of drugs against ascariasis and hookworm infection are feasible and desirable. With respect to drug testing, it was found that trials of drugs are often poorly designed and that stricter statistical tests should be applied to the data obtained.

3. VECTOR BIOLOGY AND CONTROL

3.1 As will be apparent from the following paragraphs, a considerable advance was made during the year in world surveillance of many important insect vectors of disease. The International Reference Centres for the Evaluation and Testing of New Insecticides and the WHO vector research units made useful progress in their research into insecticidal compounds of low hazard and high biodegradability and into improved methods for applying such non-polluting compounds, as well as into methods for controlling insects by biological and genetic means. There was also further development of the Organization's work on the toxicology and safe use of pesticides, notably through closer liaison with FAO for the study of both agricultural pesticides and those used for public health programmes.

3.2 In the Americas the *Aedes aegypti* eradication campaign was continued, in accordance with the decisions of the governing bodies of the Pan American Health Organization and the WHO Regional Office. Panama completed the eradication that had become necessary after reinfestation, and strenuous efforts were made in Brazil to combat the reinfestation in the northern area of that country. The Cayman Islands achieved eradication. A cost/benefit study on the prevention of *Ae. aegypti*-borne diseases, prepared by a specialist firm, was submitted to the Executive Committee of PAHO and, in October, to the PAHO Directing Council, which is also the WHO Regional Committee for the Americas.

Applied ecology

3.3 By the end of 1972 some 8550 records of seven species of *Aedes* (*Stegomyia*) mosquitos had been collated in the Organization's programme for collecting and disseminating information on the vectors of arboviruses. Notable additions to the data store were made from surveys of *Aedes aegypti* and other *Stegomyia* vectors of yellow fever in western Senegal, and of *Ae. aegypti* and *Ae. albopictus* in the cities of Rangoon, Singapore and Bangkok, where they transmit dengue haemorrhagic fever. A second edition of map printouts was distributed, consisting of 34 maps of *Ae. aegypti* on a scale of 1: 8 million and covering its distribution in the eastern hemisphere and 7 maps

of *Ae. simpsoni*, *Ae. africanus*, *Ae. luteocephalus*, *Ae. metallicus*, *Ae. vittatus* and *Ae. albopictus* on a scale of 1: 32 million, covering their distribution in Africa and Asia. Publication in the *Weekly Epidemiological Record* early in the year¹ of an account of WHO's worldwide vector surveillance system resulted in a gratifying response and the contribution of valuable data from several governments.

3.4 Thirty-two towns and villages in the United Republic of Tanzania were surveyed during the rainy season (May and June) by the WHO East Africa *Aedes* Research Unit based in Dar es Salaam; adults of *Ae. aegypti* were found in 19 and those of *Ae. simpsoni* in 22 of them. When 27 towns and villages had been surveyed in the preceding dry season (September to December), adults of *Ae. aegypti* had been found in only 3 and those of *Ae. simpsoni* in one only. These findings suggest that in most areas of this country the risk of arbovirus transmission by these vectors during the dry season is not very great.

3.5 Continued intensive studies by the WHO *Aedes* Research Unit, Bangkok, in the vicinity of that city have established that *Ae. aegypti* will oviposit in artificially exposed ovitraps up to a maximum distance of 20 m from inhabited houses, and in abandoned buildings up to 80 m away from inhabited houses. Tree-holes and leaf-axils were never infested, although a few coconut shells were found positive. Thus *Ae. aegypti* is far less feral in this area than in South India; this urban species tends to replace *Ae. albopictus* in those areas of South-East Asia where urbanization is increasing.

3.6 The density index for adult *Culex pipiens fatigans* has been standardized by the WHO Research Unit on the Genetic Control of Mosquitos, New Delhi, as the 15-minute catch per house by one collector (house index).² Mark-release-recapture experiments by this unit have established that a house index of 1 is roughly equivalent to a rural population of 10 000 adult mosquitos for a village of 200 structures. At the peak season in early May, the mosquito population of such a village can exceed 300 000 (50 000 per hectare). As density indices

¹ *Wkly epidem. Rec.*, 1972, 47, 73-80.

² *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 501, pp. 31-32.

for larval *C. p. fatigans*, the WHO *Aedes* Research Unit, Bangkok, has proposed the "house index" (percentage of house-premises infested), and a supplementary "source index" (percentage of successive 100 m² areas infested) for field breeding density.

3.7 Studies on the vector *Culex tritaeniorhynchus* conducted by the WHO Japanese Encephalitis Vector Research Unit, Seoul, showed that the peak of adult activity occurred at Seoul in mid-September, at Sintaein further south in mid-July, and at Pusan on the south coast throughout the period from late July to late September. At Seoul the period of Japanese encephalitis viraemia in pigs was 6-20 August, followed by the period for cases in man from 20 August to 20 September. This was not significantly later than that observed at Pusan. Light-trap catches indicated that the highest populations of *C. tritaeniorhynchus* were to be found at Pusan and Ulsan in the south. As in previous years, this vector could not be found anywhere in the Republic of Korea between mid-November and mid-April.

3.8 Evidence obtained by the WHO *Anopheles* Control Research Unit No. II, Kisumu, Kenya, confirms that of the A and B sibling species of *An. gambiae*, species A is more anthropophilic than species B and more readily controlled by residual insecticides. After a Stage VI insecticide trial¹ involving 5 cycles of application of fenitrothion, an *An. gambiae* population in a predominantly agricultural area which originally contained species A and B in approximately equal numbers had become a small surviving population of species B only. In a new area selected for a Stage VII trial, species A was found to be 96% positive for human blood-meals and to have a sporozoite rate of 7%, whereas species B was 86% positive for human blood-meals and had a sporozoite rate of 2.4%, again confirming that, for this part of East Africa, A is the more anthropophilic species.

3.9 Evidence of the zoophilic character of species B in a cattle-grazing region of West Africa was obtained by the WHO *Anopheles* Control Research Unit No. I, Kaduna, Nigeria. In an area where the ratio of larvae in breeding places and of adults caught indoors was 83% species A to 17% species B, indoor collections made at a Fulani encampment with many cattle contained more species B than A, and the majority of these species B adults had fed on cattle. A field larviciding experiment was performed at the end of the dry season, when breeding places were very limited, with a view to preventing the increase in density of the

An. gambiae populations which annually commences in March shortly before the rains arrive. However, a thorough and effective larviciding with difenphos of all discovered breeding places within a radius of 6 km of a village failed to stop the increase in adults, probably because the intervals of 2-3 weeks between the four successive applications were too long.

Resistance to insecticides

3.10 The further development of resistance to the chlorinated insecticides by insects of public health importance continues to reduce the effectiveness of these once-powerful weapons, as is attested to by the progressive failure of DDT to control plague fleas in the Republic of Viet-Nam and the appearance of resistance to dieldrin in certain populations of *Rhodnius prolixus* in Venezuela. The steadily increasing tolerance to DDT by West African populations of *Simulium damnosum* is hastening the trend away from the use of this persistent insecticide in rivers. Use of the organophosphorus insecticide malathion in louse powders has now become jeopardized by the development among body-lice in parts of Burundi and Egypt of resistance to it 40- to 50-fold greater than that of sensitive strains. Insecticide-resistant strains of houseflies and other species are being found to have a certain cross-tolerance even to the juvenile-hormone analogues now being developed for insect control.

3.11 In the agricultural regions of El Salvador and western Nicaragua, where *Anopheles albimanus* has developed populations resistant to malathion as well as to DDT and dieldrin, recent surveys have revealed the areas where resistance to propoxur—mentioned in the Annual Report for 1971²—has also developed; this is a serious development since propoxur is the recommended residual insecticide in this part of Central America. Tests to determine the resistance levels that were carried out in the laboratory on the larval offspring of wild-caught *An. albimanus* adults from the problem areas in El Salvador showed a 165-fold resistance to propoxur and a 9-fold cross-tolerance to fenitrothion; tests on the adults themselves also showed a considerable degree of resistance to propoxur.

3.12 More than 1500 tests of susceptibility levels in vectors have been recorded in the WHO computer survey of susceptibility or resistance during the past 10 years. The results obtained for the larvae of *Culex p. fatigans* and *Ae. aegypti* have now been mapped

¹ Further details of insecticide trials are given below, starting at paragraph 3.14.

² *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 2.113.

and added to the collection of printout maps mentioned in paragraph 3.3. *C. p. fatigans*, which has a baseline LC_{50} for fenthion of 2 ppb (parts/10⁹), has developed 25- to 50-fold resistance to this organophosphorus larvicide at Amagasaki and on Okinawa (Japan). To chlorpyrifos, for which the baseline level is about 0.3 ppb, the populations at Amagasaki and on Okinawa show a 35-fold resistance. Populations of *Ae. aegypti*, which has a baseline LC_{50} of 0.6 ppm for malathion, have developed an approximately 10-fold larval tolerance at Kuala Lumpur (Malaysia), Da-Nang (Republic of Viet-Nam), Valencia (Venezuela) and Christianstad (Virgin Islands, USA). To the larvicide difenphos, with a baseline level of approximately 1 ppb, this vector has developed a 25-fold resistance at St Catherine, Jamaica, and a 5- to 10-fold tolerance at points in Surinam, Curaçao, Dominica, and Virgin Islands and Florida (USA). Much of the testing of resistance levels in the Americas is carried out by the *Ae. aegypti* testing unit based in Jamaica.

3.13 Susceptibility-test papers impregnated with organophosphorus and carbamate insecticides are expensive and their effectiveness is normally rather short-lived, but it has been recently established that if they are stored in a refrigerator up to the time of use malathion-impregnated papers will remain completely effective for 6 months and propoxur-impregnated papers for a year. The WHO Expert Committee on Insecticides¹ has recommended the use of only two concentrations for a series of different time exposures, and the validity of this has been reconfirmed by tests with certain organochlorine, organophosphorus and carbamate insecticides that have established that doubling the exposure time is roughly equivalent in effect to doubling the concentration, i.e., that the concentration \times time effect is a constant.

Evaluation of new insecticides and development of chemical control methods

3.14 The programme for evaluating new insecticides for use in vector control has continued in collaboration with the six WHO international reference centres and five field research units. During 1972, 68 compounds were tested in Stage I² and 9 were carried to Stages II and III. The trend among pesticide manufacturers to produce fewer new compounds of the conventional insecticide type has continued. Indeed,

most of the compounds introduced for Stage I testing were submitted from non-industrial institutions which had synthesized them in an effort to find compounds with residual activity which are biodegradable and do not accumulate in wildlife and the environment. Others had growth-inhibiting properties, while yet others (not included in the regular evaluation programme) were synthetic analogues which affect the growth and metamorphosis of insects (mimics of the insect juvenile hormone).

3.15 With the scarcity of new compounds being submitted, greater emphasis is being placed on even more intensive investigation of the most promising compounds. The same policy is being applied to the juvenile-hormone mimics, which are being produced by industry in considerable numbers, but of which only those that hold out the best prospects warrant investigation for vector control. Already two such compounds have been tested by the WHO *Aedes* Research Unit, Bangkok, to establish the dosage levels at which they are most effective against *C. p. fatigans*.

3.16 The WHO East Africa *Aedes* Research Unit, Dar es Salaam, conducted a pilot study in a suburb of that city covering 2.5 km² and in 4.4 km² of adjoining wetlands, to achieve control of *C. p. fatigans*. First, a programme of public education followed by community clean-up achieved 35% reduction in the number of breeding sites. Then the application of 1% chlorpyrifos emulsion to all breeding sites at the rate of 1 ppm achieved a 95% reduction in the adult population. After two additional treatments at 3-month intervals, the adult population of *C. p. fatigans* had been reduced from 20 to 0.1 per room. Field tests in two other urban communities in the United Republic of Tanzania indicated that chlorpyrifos was greatly superior to malathion as a larvicide and that chlorpyrifos-methyl was superior to fenthion.

3.17 During 1972, a geographical and epidemiological reconnaissance was completed of an 82-km² area destined for a Stage VII (epidemiological) trial with fenitrothion to be carried out by the WHO *Anopheles* Control Research Unit No. II, Kisumu, Kenya, starting in 1973 (see also paragraph 3.8). A sampling of the inhabitants of all ages revealed a parasite rate of 65%, mostly *Plasmodium falciparum*. During the rainy season, the anopheline densities were 40-50 *An. gambiae* and 30 *An. funestus* per house, with sporozoite rates reaching 10%. The great majority of the *An. gambiae* were species A and fed on man, and even with species B there was rather little zoophilia in this agricultural area. From both the parasitological and the entomological viewpoint, therefore, this would appear to be an ideal area for a Stage VII evaluation.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 443.

² The stages in the evaluation programme are: Stage I, initial screening tests; Stages II and III, laboratory and simulated field tests; Stage IV, field tests; Stage V, village-scale trials; Stage VI, operational field trials; Stage VII, large-scale trials.

3.18 A considerable number of compounds was tested during 1972 for their residual contact activity on *Glossina* species by the WHO International Reference Centre for the Evaluation and Testing of New Insecticides, Porton Down, United Kingdom. As a result four organophosphorus insecticides (fenitrothion, tetrachlorvinphos, bromophos and jodfenphos) have been selected for field testing in ultra-low-volume applications in West African gallery forest. In addition, a synthetic pyrethroid, one of the constituents of resmethrin, will be tested at one-tenth the dosage employed with the organophosphorus compounds.

3.19 During 1972, the WHO *Aedes* Research Unit in Bangkok investigated methods of applying safe organophosphorus insecticides in the form of mists generated by the ultra-low-volume (ULV) method to provide lasting control of *Ae. aegypti* in urban communities, thus protecting them from transmission of the viruses that cause dengue haemorrhagic fever. Three types of dispersal apparatus were tested in large-scale experiments—one vehicle-borne, one carried on a stretcher by two men, and the third a backpack mist-blower carried by one man. It was established that five applications, each at a week's interval, of fenitrothion at 0.5 kg/hectare from the vehicle-mounted generator, or two applications at an interval of two weeks of fenitrothion at 1.4 kg/hectare from the hand-carried generator, provided effective control lasting 4-5 months after the final application.

3.20 The WHO East Africa *Aedes* Research Unit, Dar es Salaam, treated three 2-km² rural areas with malathion applied at 0.7 kg/hectare from light aircraft, with a view to controlling the *Stegomyia* vectors of arbovirus diseases. With two such applications 1 week apart, complete control of *Ae. simpsoni* was obtained for a period of 2 weeks and of *Ae. aegypti* for a period of 1 week, after the second application. An attempt by the unit to establish control of these mosquitos at an international airport was only partially successful owing to infiltration from the surrounding villages and agricultural areas.

3.21 As an essential first step in the preparations for the seven-country onchocerciasis control programme in West Africa referred to in paragraph 2.63, the WHO International Reference Centre for the Evaluation and Testing of New Insecticides, Bobo Dioulasso, Upper Volta, investigated insecticides, formulations and application methods which could be considered for *Simulium* larviciding. Eleven compounds were tested at Stage IV (initial field examinations) for their effectiveness against *Simulium* larvae in flowing streams. As a result of these tests conducted in Ivory Coast, Mali and Upper Volta, four organophosphorus

compounds were chosen for larger-scale tests involving their application from aircraft; these were difenphos, chlorpyrifos-methyl, phoxim and chlorphoxim, and all were found safe to handle and readily biodegradable. Trials with fixed-wing aircraft established that a coarse-droplet spray was as effective as a fine one and involved less loss of droplets from the target area. Grants from the Federal Republic of Germany and the USA have made it possible to obtain the use of a helicopter so that its performance in the reconnaissance of the watercourses, the application of the larvicide and the assessment of the results, and its cost/efficiency, can be compared with those of the fixed-wing aircraft. Owing to the precision with which it can treat a given breeding area, the helicopter has also been extensively used to compare different insecticides and formulations under field conditions. The same WHO International Reference Centre is assessing five insecticides for the control of *Glossina* from the ground or the air (see paragraph 3.18), since trypanosomiasis could become a problem in valleys reclaimed by the onchocerciasis control programme.

3.22 In collaborative studies by the WHO International Reference Centre for the Evaluation and Testing of New Insecticides, Savannah, Ga., USA, and several pesticide manufacturers, a special emulsion concentrate formulation has also been developed that is suitable for application from aircraft to rivers for the control of *Simulium* larvae. A provisional specification incorporating low solvent volatilization in air, high emulsifiability on reaching the water, and a suitable specific gravity for contacting the larvae has been prepared for use in the procurement of materials for operational field tests of the candidate insecticides involved.

3.23 A new research unit was established in November in Venezuela, with the objective of developing methods of controlling the triatomine vectors of Chagas' disease so that transmission may be halted. It will work in conjunction with the vector control section of the Venezuelan Ministry of Health, and its initial work will be concerned with the ecology of the domestic and feral vectors and reservoirs of the disease. The *Aedes* Research Unit previously in Bangkok concluded its work there and moved at the end of the year to Djakarta, where, as the WHO Vector and Reservoir Research Unit, it will investigate the vectors and reservoirs of rodent-borne disease, as well as those of filariasis, dengue and Japanese encephalitis.

3.24 In cooperation with the Government of Denmark and with DANIDA support, WHO again conducted a course on insects and rodents of public

health importance, with particular emphasis on mosquito control in urban environments. The 1972 course was held in Bangkok, with participants from nine countries in the South-East Asia Region.

Biological control

3.25 During the year under review stress was laid upon field experiments performed by the WHO research units with selected biological control agents. These included *Gambusia* and *Poecilia* among larvivorous fish, and *Reesimermis* among parasitic nematodes. Progress towards field experiments was made with the fungus *Coelomomyces*, the insect parasite *Gryon*, and the predacious mosquito *Toxorhynchites*. Consideration was also given to the use of insect viruses for the control of mosquito larvae (see paragraphs 1.72-1.74).

3.26 A very encouraging degree of control of *Culex p. fatigans* in wells by the larvivorous fish *Gambusia affinis* has been obtained by the WHO Research Unit on the Genetic Control of Mosquitos, New Delhi; and the Organization is giving support to a project in the irrigation system in the Lamia plain in Greece, in which *Gambusia* is propagated and its effect in controlling *An. sacharovi* is continuously assessed.

3.27 Studies with the guppy *Poecilia reticulata* by the WHO *Aedes* Research Unit in Bangkok, which has developed methods of mark-release-recapture using a vital dye, have shown that *Poecilia* established in heavily polluted urban waters may fail to control *C.p. fatigans* larvae when the refuse is so extensive as to block the access of the fish to the larvae and to provide them with an alternative supply of food which they do not have to bother to chase; moreover the rate of oviposition of the *Culex*, which abound in such foul waters, is too great for the fish to reduce.

3.28 The use of indigenous larvivorous fish is being investigated at the WHO *Anopheles* Control Research Unit No. I at Kaduna, Nigeria. A WHO study has shown that *Epiplatys senegalensis*, an egg-laying cyprinodontid, is obtainable in quantity from certain localities and is entirely suitable for use in inoculating the breeding sites of *An. gambiae* and *An. funestus*. An indigenous annual fish, *Aphyosemion calliurum*, also appears suitable for use in the breeding sites which reappear with the coming of the rains.

3.29 The parasitic nematode *Reesimermis nielsenii*, which has proved effective in controlling *Culex p. fatigans* and two species of anophelines in the USA, has been investigated by the research unit in Bangkok,

where in a field trial in a suburb a rate of parasitism of *C.p. fatigans* of 1-24% was obtained in open drains. The nematodes employed had been brought by air from Lake Charles, Louisiana, USA; probably a local supply from an acclimatized source would have given better results. A *Reesimermis* nematode is also being tested against *An. albimanus* at the Central America Malaria Research Station, San Salvador, and the possibilities of mermithid nematodes for local control of *Simulium damnosum* in small backwaters in West Africa are now being investigated by the Office de la Recherche scientifique et technique outre-mer (ORSTOM) with financial support from the International Development Research Center, Canada.

3.30 Field use of the parasitic fungus *Coelomomyces* against mosquito larvae has awaited methods for its laboratory production. Success in such production is now being obtained for *C. punctatus* at the University of North Carolina, Chapel Hill, USA, and is being developed for *C. psorophorae* at the Boyce-Thompson Institute, Yonkers, New York, and the Memorial University of Newfoundland, Canada, the latter with WHO support. The University of Otago, New Zealand, similarly supported by WHO, is investigating *C. macleayi* and *C. opifexi* for use against the filariasis and dengue vector *Aedes polynesiensis* in Western Samoa and Fiji. Another parasitic fungus, *Lagenidium* sp., has given most promising results for the control of *Culex nigripalpus* in Georgia, USA.

3.31 At the WHO *Anopheles* Control Research Unit No. I, Kaduna, Nigeria, 16% of the breeding sites of *An. gambiae* had larvae infected with a species of *Coelomomyces*, probably *C. africanus*. With respect to microsporidia, 20% of the breeding sites were infected with *Thelohania*, while a species of *Gregarina* was present but *Nosema* was absent. At the WHO *Anopheles* Control Research Unit No. II, Kisumu, Kenya, a high proportion of the *An. gambiae* larvae were infected with either *Coelomomyces* or larval nematodes. By means of the precipitin test, dytiscid water beetles and tadpoles were identified as predators of anopheline larvae and lycosid spiders and predacious flies as having fed on the emerging adults.

3.32 The chalcid wasp *Gryon triatoma*, discovered parasitizing eggs of *Triatoma rubrofasciata* in Kerala (India) and Singapore, has been colonized and shipped to the Venezuelan Institute for Scientific Research, Caracas, where it has successfully parasitized the South American *T. maculata* and *T. phyllosoma*. This project, conducted by the Commonwealth Institute of Biological Control and supported by WHO, will also investigate the possible range of

Triatoma hosts for *Gryon* at the University of Costa Rica, San José.

3.33 The predacious mosquito *Toxorhynchites brevipalpis* was the subject of a small-scale experiment conducted by the WHO East Africa *Aedes* Research Unit to control *Ae. aegypti* breeding in used-car and tyre dumps in Dar es Salaam, and a more comprehensive trial is planned by the International Centre for Insect Physiology and Ecology in Kenya to take place in the vicinity of Mombasa. A small-scale trial conducted with this species in Maryland (USA) was successful in controlling *Ae. triseriatus* breeding in tree-holes.

Genetic control

3.34 The WHO Research Unit on the Genetic Control of Mosquitos, New Delhi, conducted further field experiments against *Culex p. fatigans* during the year. Into one village it released males of a strain cytoplasmically incompatible with the wild mosquitos, and into a similar village it released chemosterilized males of the Delhi strain. In each case 10 000 to 15 000 males were released daily at sites within and around the village. After 10 weeks it was found that the treatments gave similar results, each inducing between 10% and 20% sterility in the population.

3.35 Since the use of the cytoplasmically incompatible strain involves much greater labour in that all female contaminants must be removed from the male releases, it was decided to continue the chemosterilized male releases, not only in the same village but also in another. The numbers released were increased to 100 000 per day, and this resulted in the sterility in the populations increasing to 50%. Because it did not increase further, a barrier zone 1 km wide was established by the use of insecticides and larvivorous fish in an attempt to prevent immigration of adult *C.p. fatigans* into the villages; however, this width of barrier proved insufficient for the purpose.

3.36 At present the unit is producing 5 million Delhi-strain pupae per week, at a cost of US \$10 per million. For the large-scale experiment to follow, involving an urban area of 20 km² and containing more than 10 000 houses, the unit is aiming at a production rate of 70 million pupae per week.

3.37 Since in the long run the release of strains carrying self-propagating genetic factors may be a more economical and effective means of genetic control, a strain of *C.p. fatigans* combining chromosomal

translocations with cytoplasmic incompatibility has been developed at the WHO International Reference Centre for Maintenance and Distribution of Standardized Strains of the *Culex pipiens* Complex, Mainz, Federal Republic of Germany. These translocations are passed on with the male-determining chromosome and cause 85% sterility. This strain is now being modified by the WHO unit in New Delhi by means of suitable crosses to make it capable of withstanding the high temperatures prevailing in the New Delhi area. Its vectorial capacity for *Wuchereria bancrofti* is also being determined.

3.38 Two strains of *Ae. aegypti* bearing similar translocations have been developed at the WHO International Reference Centre for Maintenance and Distribution of Standardized Strains of the *Aedes* Complex, Notre Dame, Ind., USA. They induce 75-90% sterility, and are undergoing evaluation by the unit in New Delhi for their biological fitness and mating competitiveness. A suitable target area in Delhi has been mapped and its existing *Ae. aegypti* population has been determined to be 22 000 per hectare in August.

Vector control in international traffic

3.39 Hand in hand with the constantly increasing speed and frequency with which people travel and goods are transported from one country to another go a growing risk of potentially harmful insects and rodents being carried from one area to another and an increasing responsibility to ensure that ships and aircraft are not infested by vectors from cargoes and from the areas around port and airport installations. In order to help control officers and port authorities in their vector control work the Organization published early in the year a manual entitled *Vector Control in International Health*,¹ compiled with the help of experts in the various fields covered. The book deals in detail with the biology and control of insects and rodents associated with the diseases of major significance in international health and concludes with a series of annexes that include 16 illustrated keys to important insect vectors.

3.40 Among the measures to which the book refers is the dichlorvos disinsection system for aircraft. Through the WHO International Reference Centre for the Evaluation and Testing of New Insecticides, Savannah, Ga., USA, the Organization has been conducting investigations into certain problems con-

¹ World Health Organization (1972) *Vector control in international health*, Geneva.

nected with this system that had been raised by the aircraft industry. These studies have now been completed and a meeting convened early in 1972 by the United States Federal Aviation Administration concluded that the system constituted no hazard that would affect airworthiness; the Public Health Service of the USA has approved its use in multi-aisled aircraft in that country. The report of these investigations has been forwarded for consideration by ICAO.

3.41 Among new aerosol pyrethroid formulations, resmethrin and bioresmethrin have been found in studies organized by WHO to be highly effective, and passenger acceptance has been satisfactory. Members of the WHO Expert Advisory Panel on Insecticides reviewed the results and their recommendations were considered by the Committee on International Surveillance of Communicable Diseases at its meeting in November (see paragraph 1.28).

The safe use of pesticides

3.42 Studies on the safety of newly developed insecticides are an inherent element throughout the seven stages of the WHO programme for the evaluation and testing of new insecticides. Toxicological assessments were made during the year on a number of compounds at Stage II, when the oral and dermal toxicity of the compounds to laboratory animals is determined. Action is taken at this early stage because new compounds often have to be withdrawn from further testing on the ground of their possible hazard to man. The application of any insecticide necessarily entails that the spraymen and occupants of treated dwellings will be exposed to it. For the control of adult anophelines, therefore, only those insecticides that are considered to be of sufficiently low mammalian toxicity to be safely sprayed on the walls of houses by workmen using simple safety precautions are recommended for Stage V trials. While such village-scale trials are designed primarily for the entomological assessment of the effectiveness of new compounds, they also permit the collection of valuable toxicological information, this being often the first time that human exposure to a new compound takes place under field conditions. A medical toxicologist is always present during the spraying operations in Stage V trials, to investigate any possible adverse effect on spraymen and villagers by clinical examination supported by biochemical tests, and to determine the precautions to be observed by operators for their own protection and that of the inhabitants.

3.43 Studies on the safety of the organophosphorus compound chlorphoxim were carried out in 1972 during a Stage V village trial performed by the WHO *Anopheles* Control Research Unit No. I, Kaduna, Nigeria. No complaints were received and no adverse effects could be detected by clinical examinations or by blood cholinesterase determinations among exposed baggers, spraymen or inhabitants. This investigation showed that chlorphoxim should be safe enough to warrant its use in larger trials, provided that operators wear protective clothing and observe simple precautionary measures similar to those employed in this trial.

3.44 The WHO-supported survey of the possible long-term effects of DDT, carried out among malaria eradication spraymen in Brazil, has continued. This survey also covers two control groups, one being composed of persons with no apparent contact with DDT and the other of those living in sprayed houses. The results to date of this and of a similar survey carried out in conjunction with the Indian Council of Medical Research have been analysed and were presented in October to the WHO Expert Committee on Insecticides, which dealt particularly with the safe use of pesticides (see paragraph 3.46). Although many spraymen were found to have high blood levels of DDT and its analogues, and evidently to have had these for many years, no ill effects have yet been discovered among them in either of these surveys.

3.45 Continuation of the experiments sponsored by the International Agency for Research on Cancer (see also paragraph 4.77) and carried out in parallel in Lyons and Milan have confirmed that continuous feeding of DDT to two strains of laboratory mice over their entire life span results in an increased incidence of hepatomas. In one strain (BALB/c) this effect was not observed until the levels were as high as 250 ppm DDT, but in the other (CF₁) it was detectable at the 50-ppm level in female mice and the 2-ppm level in male mice. There was still no evidence of a cumulative transgenerational effect even when continuous exposure was maintained until the third generation. However, there is preliminary evidence that the metabolite *p,p'*-DDE produces this effect on CF₁ mice at 250 ppm; whereas in mice less than 10% of the DDT stored in the body fat is converted to DDE, between 20% and 80% is stored as DDE in man. The possibility that the mouse hepatomas may regress after cessation of exposure to DDT is now being investigated. The relevance of the above data to a possible risk to humans was reviewed by a working party in Lyons in October. Evidence of any correlation between the levels of DDT plus metabolites found in

human fat and the patterns of cancer incidence in various countries around the world has not been detected.

3.46 In October the WHO Expert Committee on Insecticides considered the results obtained in the WHO programme for evaluating and testing new insecticides since the last meeting on the subject in 1966, and made recommendations concerning the safety of new insecticides of relatively high biodegradability which may be used as alternatives to DDT in malaria eradication programmes. It reviewed the data on the tumorigenicity of DDT in mice, data on its storage and excretion, and the results obtained in morbidity studies in DDT spraymen and formulators (many of these studies have been conducted or supported by the Organization). Taking into account the fact that the first statement that DDT might have a "tumorigenic tendency" in rats was published as long ago as 1947 and that in a small group of heavily exposed formulators followed up for 20 years no adverse effects have been observed, the committee did not regard the new evidence on mice as providing them with an adequate basis for recommending the withdrawal of DDT where its continued use could be a life-saving measure in the control of disease and the protection of food or crops. The committee considered that in these circumstances any possible risk to man suggested by the above-mentioned animal studies was outweighed by the benefits arising from the properly controlled use of DDT. Among other items, the committee discussed the hazards involved in the treatment of different types of water with certain mosquito larvicides and made recommendations for their appropriate use on the ground of safety; on the same ground it recommended the use of certain biodegradable compounds of low mammalian toxicity as *Simulium* larvicides in control programmes against onchocerciasis. The committee also discussed the safety of aircraft disinsection by sprays of synergized pyrethrins and pyrethroids and by dichlorvos vapour, the safety aspects of molluscicides proposed for schistosomiasis control, and the safety of a number of fast-acting rodenticides used in public health programmes.

3.47 In collaboration with FAO, WHO has further developed the programme of research into and promotion of the safe use of pesticides in agriculture. Two seminars were held to provide instruction in the safe and efficient use of pesticides. One, in Costa Rica, was organized by FAO and its Industry Co-operative Programme; the other, in Cairo in July, was a WHO Eastern Mediterranean regional seminar to which agricultural participants were invited. These seminars

have demonstrated the need for increased cooperation between health and agricultural authorities and for the development of pesticide control in developing countries. They have also revealed the lack of positive information on the mortality and morbidity caused by the distribution and use of pesticides. Data sheets on the important pesticides, detailing their toxicology and their potential hazards, are also being prepared together with FAO in order to help developing countries to attain some uniformity in schemes for the control of pesticides. The issue of such data sheets was urged by the expert committee referred to above. (See also paragraphs 6.57 and 6.71.)

3.48 In order to increase the facilities available for dealing with problems in mammalian toxicology and to promote the safe use of pesticides, WHO also continued to collaborate with FAO (the executing agency) in the establishment of laboratories in UNDP plant protection projects in Brazil and Egypt. In the project in Brazil, which is now in its final stage, there is a functioning toxicology laboratory and field work has begun. In Egypt, toxicology facilities are being established with a view, in the first instance, to performing toxicity tests on laboratory animals and certain biochemical tests to measure exposure to pesticides; field work will be carried out at a later stage.

3.49 Assistance has also been given to the Industrial Toxicology Research Centre, Lucknow, India, to establish an epidemiological section to carry out field work on the safe use of pesticides. In addition, advice on that subject and on related technical aspects of toxicology was provided to institutes or national authorities in Bulgaria, Egypt, Japan, India, Turkey, Yugoslavia and Zambia. Discussions were held with health and agricultural authorities from a number of Central American countries on the health aspects of the pesticides used there.

3.50 A recent WHO study of such national statistics on the subject as exist has shown that accidental poisoning as a result of the improper use of pesticides most probably presents a serious problem on a world scale. However, the study had to be based on data from a handful of developed countries. For most countries, the true extent of the problem—which is thought to be greater in developing than in developed areas—cannot be ascertained in the absence of a system for the routine reporting of accidental pesticide poisoning. The WHO Expert Committee on Insecticides reviewed this subject in October and recommended the annual reporting of such accidents to WHO and the development of standardized data collection and recording methods for this purpose.

3.51 In addition to individual accidents, there have been a number of outbreaks of collective pesticide poisoning over the past 15 years, most of them in developing countries. Some were due to the contamination of food as a result of mishaps in transport or storage. Others were caused by the consumption of seed-grain treated with a mercurial fungicide. This was the cause of a large outbreak of poisoning in rural Iraq early in 1972, when, despite official warnings, such seed was used for fodder and for human consumption. In response to a request from the national health authorities for emergency assistance, the Organization

provided the services of experts in toxicology, epidemiology and ecology. There is a clear need for rapid assistance when outbreaks of this kind occur, and WHO is therefore extending plans for the speedy provision of facilities to identify the causative pesticide, to limit the outbreak by epidemiological study, and to advise local practitioners on the treatment of affected persons. Measures to prevent such accidents are being promoted through close liaison with the United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods.

4. NONCOMMUNICABLE DISEASES

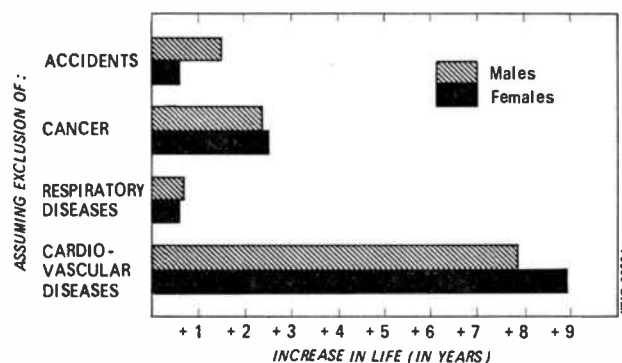
Cardiovascular diseases

4.1 Using existing knowledge, it is generally possible to prevent rheumatic fever, rheumatic heart disease, and heart diseases of infectious or parasitic origin. In addition, hypertension and the majority of conditions leading to cor pulmonale can now be controlled. Death and disablement from ischaemic heart disease and cerebral stroke could be substantially reduced if all available means were deployed on a massive scale. Even if this were done, cardiovascular diseases would remain one of the foremost public health problems in most countries, since knowledge of their etiology, pathogenesis and prevention is still far from complete. As the factors contributing to these diseases are already present in young people, it seems that prevention could be achieved by taking adequate measures among young adults or even by ensuring the optimum development of children and adolescents. In itself, however, this would not suffice. Fig. 3 shows the hypothetical increase in expectation of life at age 5 (calculated from life tables computed by WHO) that would follow if the elimination of certain important causes of death could be assumed. The estimated prolongation would be less than 2 years if respiratory diseases or accidents could be discounted, and the exclusion of malignant neoplasms would result in a prolongation of less than 3 years. If, however, all cardiovascular diseases were to be eliminated, the average increase in expectation of life would be 8 years for males and 9 years for females. These estimates, however crude, clearly indicate the need, when conducting prevention at the community level, to take due consideration of the medical and social problems of aging.

4.2 The Organization is coordinating cooperative pilot studies, in defined population groups, on the prevention of rheumatic fever, the control of hypertension, the control of cerebral stroke, and the care and rehabilitation of patients with acute myocardial infarction. The aim of these studies is to see what can be done at the *community level*, in various socio-cultural settings and under different systems of health care, for the early recognition and treatment of cardiovascular diseases, for their prevention and for the rehabilitation of patients. In some places combined programmes have been established: for example, a pilot

study of the community registers of acute myocardial infarction and of stroke is being undertaken in an area of Dublin and in Göteborg (Sweden), and both hypertension and stroke programmes are being carried out in Fukuoka City (Japan) and Moscow. In North Karelia (Finland), the area with the world's highest known incidence of myocardial infarction in man, WHO is cooperating with the Finnish Government and the local authorities in a health education campaign aimed at teaching people to avoid the known coronary risk factors. An ischaemic heart disease register has been established and a hypertension control programme and stroke study are in progress in part of the area, using simplified operating protocols based on earlier feasibility studies.

Fig. 3. Hypothetical increase in expectation of life at 5 years, assuming the exclusion of certain causes of death, 1968^a



^a Based on life tables for 35 countries in *Wld Hlth statist. Rep.*, 1972, 25, 430-442.

4.3 The data collected in the above pilot studies on rheumatic fever, hypertension, stroke and myocardial infarction are being processed centrally at WHO headquarters. The registration of patients is not an end in itself but a tool to obtain information on the burden of the disease on society and how it is being handled in the community and also to facilitate the follow-up of patients. The hypertension and rheumatic fever programmes include systematic therapeutic or prophylactic interventions and evaluations of their effectiveness. The European Region is taking part in all of the pilot studies, and the Eastern Mediterranean Region in some of them. It is anticipated that the various projects will eventually be incorporated

in comprehensive programmes of cardiovascular disease control within the health services of Member States.

4.4 In 1970, WHO drew up proposals for an international cooperative study on the control of streptococcal infections, *rheumatic fever* and glomerulonephritis. The project, which was initiated in Barbados in 1970, was extended to Cairo and Teheran in 1971 and to Kingston, Lagos, Nicosia and Ulan Bator in 1972. The programme includes case finding, registration, prophylactic treatment and the follow-up of patients with rheumatic fever and rheumatic heart disease.

4.5 A WHO consultation on the prevention of rheumatic fever and rheumatic heart disease was held in Cairo in February 1972. The participants, who came from Algeria, Bulgaria, Cyprus, Czechoslovakia, Egypt, Iran, Morocco and Sudan, discussed the organization of collaborative control programmes and the question of diagnostic criteria. It was considered that, in order to investigate the incidence and prevalence of rheumatic fever more closely and to develop a systematic approach to its control, pilot control programmes should be established in communities of limited size. An operating protocol, which had undergone intensive testing since 1970, was amended and adopted.

4.6 The participants agreed that the criteria used at present for the diagnosis of rheumatic fever need to be reviewed for several reasons: the clinical pattern of the disease may be changing in accordance with certain long-term trends and may also be affected by socioeconomic developments; it may differ in various parts of the world, and may vary according to the strain of streptococcus involved. An attempt should therefore be made to correlate clinical signs and symptoms in acute rheumatic fever and rheumatic carditis with valid bacteriological and serological data.

4.7 It is obviously difficult to muster a great number of patients with acute or active rheumatic fever within a reasonably short time. It would be equally difficult to increase the number of centres with highly specialized and reliable laboratory services. For these reasons, it was suggested that, in the proposed collaborative study of rheumatic fever criteria, the cooperating centres should make clinical observations according to a common operating protocol and that the specialized laboratory observations should be centralized at the WHO International Reference Centre for Streptococcus Typing, Prague, and the Cairo laboratory that is participating in the cooperative rheumatic fever project mentioned above.

4.8 During 1972, *hypertension* control pilot programmes were started at centres in Belgium (Louvain), Finland (North Karelia), France (Lyons and Paris), Israel (Tel Aviv), Italy (Verona), Japan (Fukuoka and Tokyo), Mongolia (Ulan Bator), Nigeria (Ibadan), Turkey (Ankara) and the USSR (Moscow). The progress of the programmes at these centres was reviewed in November at a meeting of investigators. Assessments were made of the number of unknown hypertensive patients and of the adequacy of the treatment given to known patients.¹

4.9 *Stroke* control pilot programmes were started in 1971 and are now under way in 13 centres in Denmark, Finland, Ireland, Israel, Japan, Sweden, the USSR and Yugoslavia. Data on 1865 patients had been assembled by the middle of September and were analysed by WHO. The morbidity and mortality figures and data on the severity of the cases encountered, the use of hospital care and rehabilitation services and the treatment provided for hypertension in the different study areas were compared at a meeting held in Copenhagen in November. Despite the short observation period, it was noted that the incidence of stroke differs significantly between study areas and that not enough is being done at the community level to prevent stroke through the control of hypertension.

4.10 The registration in defined areas of all patients with *acute myocardial infarction* is being used to evaluate the frequency of ischaemic heart disease, the types of care and rehabilitation provided, and prognosis. Information obtained on some 13 000 patients in the course of a large-scale study carried out in 1971 and 1972 in 20 registration areas—18 in Europe, one in Australia and one in Israel, covering a total population of more than 4 700 000—was evaluated at a meeting held by WHO in Copenhagen in June and attended by the directors of all the participating registers. Preliminary results indicate a rather similar incidence in all study areas, with varying case-fatality rates. The time before the patient or his family sent for a doctor and the time before the first treatment was given both varied considerably. The analysis of the data was completed by the end of 1972. It was found that most deaths from myocardial infarction occurred within an hour of the onset of the infarct and that a substantial number of subjects died instantaneously. However, a number of symptoms were reported to be present 2-4 weeks prior to the development of acute myocardial infarction. Most information on this is retrospective; the risk of developing new infarctions is high during the first

¹ See paragraph 6.103 for research on the relation between cardiovascular disease and work stress.

year, and by following up patients included in ischaemic heart disease registers, it should be possible to obtain valuable prospective population-related data. At a WHO working group on symptoms and signs predictive of acute myocardial infarction held in Copenhagen in February 1972, participants from 11 registration areas agreed on an operating protocol whereby patients will be followed up at frequent intervals in order to assess the prognostic significance of the different signs and symptoms.

4.11 Representatives of rehabilitation centres for patients with myocardial infarction in various European countries met in Moscow in November to discuss the evaluation of the programmes at these centres and a proposed comprehensive study of the subject based on a revised operating protocol adopted at two *ad hoc* WHO meetings earlier in the year. The problem of standardizing methods of investigation was also reviewed.

4.12 Since a high proportion of deaths from acute ischaemic heart disease occur before myocardial necrosis develops, a study on ways of improving autopsy diagnosis was started in 1970 in departments of pathology in Brussels, Geneva (Switzerland), Göteborg (Sweden), Helsinki and Prague.¹ In cases where death was ascribed to acute ischaemic heart disease or acute myocardial infarction, assessments were made of the time elapsing between the onset of the infarct and death and of the value of different techniques: macroscopic examination of the heart, coronary angiography, and the staining of transverse slices of the heart with nitro-blue tetrazolium (NBT) prior to histological examination. Coronary angiography rarely provided more information than did routine sectioning of the coronary arteries. In 21 out of 60 cases with a clinical history of acute ischaemic heart disease of less than 12 hours, NBT staining on transverse slices of the heart indicated areas of suspected ischaemia not evident on gross examination of the unstained heart. This procedure is therefore of value in choosing those areas where histological techniques can best be used for the confirmation of myocardial damage, but it needs to be further improved and has to be performed under standardized conditions.

4.13 During 1972, WHO provided assistance to Egypt and Israel for the organization of coronary care units at the community level.

4.14 The epidemiology, control and prevention of ischaemic heart disease, hypertension and rheumatic

heart disease and the rehabilitation of patients were reviewed in December at a seminar held in Teheran by WHO in cooperation with the Government of Iran. This, the first Eastern Mediterranean regional seminar to be organized on the prevention of major cardiovascular diseases, was attended not only by participants from countries in the Eastern Mediterranean Region but also by some from Algeria, Morocco and Turkey in the European Region.

4.15 The *primary prevention of ischaemic heart disease* is the subject of a number of single-factor or multi-factor trials, a review of which has been compiled by WHO in cooperation with the Council on Arteriosclerosis and Ischaemic Heart Disease of the International Society of Cardiology. Most of these trials are principally concerned with influencing the disturbed lipid metabolism by appropriate diet or drugs. Encouraging results have been obtained but no final solution to the problem so far. This may be partly because most trials, for practical reasons, start with middle-aged men in whom coronary atherosclerosis is already well developed and who may have scars in the myocardium testifying to clinically silent ischaemic attacks.

4.16 Hypertension usually begins later than metabolic disturbances, characterized by elevated blood lipid levels, and control studies have shown that its treatment, however efficient, is unlikely to reduce the incidence of ischaemic heart disease to any appreciable extent. It has been shown, too, that in itself the hypertrophy of the left ventricle associated with established hypertension greatly increases the risk of death from ischaemic heart disease. The reduction of high calorie intake (particularly from fats) and the limitation of cigarette-smoking still appear to be most important preventive measures.

4.17 As an increase in blood lipid levels appears to be the first biochemical abnormality in atherosclerosis, an investigation of the effect of reducing blood cholesterol levels in adults of 30-59 years of age without manifest heart disease has been sponsored and coordinated by the Organization. This double-blind randomized trial started in Edinburgh in 1965 and was extended to Prague and Budapest in 1966 and 1967.

4.18 All the subjects had been admitted to the trial by 1971, and the progress to date was reviewed in Budapest in December 1972 at the sixth meeting of the investigators concerned.

4.19 A multifactorial approach to the prevention of ischaemic heart disease is clearly justified, but it

¹ Bouchardy, B. et al.: The pathological diagnosis of acute ischaemic heart disease. *Bull. Wld Hlth Org.* (in press).

involves some complex problems: in particular, the relative importance of the different factors is difficult to establish. The study in Rotterdam, Netherlands, and Kaunas, USSR, of the methodology of cardiovascular prophylaxis in two contrasting medical care systems was continued, and preliminary data have been analysed (see paragraph 12.18).

4.20 Other collaborative multifactor primary prevention trials sponsored by WHO were started at centres in Belgium, Italy, Poland and the United Kingdom in 1972. Investigators from the different centres met in Warsaw in June. A progress report on a randomized study in different factories in the United Kingdom was presented, and agreement was reached on an operating protocol. A centre in Sweden is investigating the primary and secondary prevention of ischaemic heart disease on a population basis, individuals being assigned to intervention and control groups.

4.21 The factors recognized as predisposing to ischaemic heart disease accumulate with age and the risk increases with the number of factors. However, most of those contracting ischaemic heart disease present only one or two major risk factors. Ideally, preventive measures should be applied to whole populations, starting in childhood, and should concentrate on proper nutrition and the creation of the best conditions for the physical and mental development and growth of children and adolescents. To encourage studies of this type of long-term prevention, a WHO symposium on the metabolic aspects of ischaemic heart disease prevention was held in Madrid in October, in cooperation with the Council on Arteriosclerosis and Ischaemic Heart Disease of the International Society of Cardiology. The discussions were mainly concerned with investigations of the metabolic processes associated with the development of atherosclerosis and ischaemic heart disease, emphasis being placed on ways of reversing or inhibiting the development of these diseases. Suggested subjects of investigation included: common metabolic pathways in lipids and carbohydrate metabolism; the role of trace minerals; the problem of adequate nutrition in relation to optimum physical and mental development; and the detection and care of persons at imminent risk of myocardial infarction.

4.22 There is evidence that the chemical characteristics of the environment have an influence on the occurrence of cardiovascular diseases. The negative association between hard water and mortality found in some countries may mean that soft water contains certain harmful elements or that it lacks protective

elements found in hard water. Experimental studies and circumstantial evidence indicate that disturbances in the balance of minerals in soil or water could increase the incidence of chronic cardiovascular disease. Certain minerals at certain concentrations—for example, calcium, chromium, fluorine, manganese, silicon, vanadium and zinc—seem to exert a beneficial effect on cardiovascular function, whereas cadmium, cobalt and lead may be detrimental.

4.23 WHO and IAEA are carrying out international surveys on the subject with the collaboration of institutes in a number of countries. IAEA has made arrangements with the US National Bureau of Standards for the provision of a quantity of standard bovine liver reference material, and samples have been sent to all the participating analytical laboratories, which will use them to check their analytical methods and will report the results directly to IAEA. The collection of autopsy specimens of the heart, liver, kidney and certain arteries and of sera, finger-nail clippings and urine specimens from different parts of the world has continued. The pathological, clinical and epidemiological data are analysed by WHO, and the trace element analyses are carried out in centres selected by IAEA. The following trace elements are being studied: cadmium, chromium, cobalt, copper, iodine, iron, lead, manganese, molybdenum, nickel, selenium and zinc. Analyses for calcium and magnesium are also made.

4.24 Cadmium content and cadmium/zinc ratios are being compared in autopsy specimens of the liver and the kidney from both hypertensive and non-hypertensive subjects. Specimens from Brazil, Finland, Hong Kong, Nigeria, Singapore and Sweden are histologically examined at a central laboratory in St Louis, Mo., USA, and are then sent to other laboratories to be analysed for cadmium and zinc. Samples of refined and non-refined sugar and of polished and unpolished rice have been collected from 17 countries and analysed for cadmium, chromium, copper, selenium and zinc in two laboratories in the USA and one in Italy.

4.25 Investigations are also in progress on the relationship of water hardness to cardiovascular death rates in England and Finland and to blood pressure patterns in Iran, Papua New Guinea and some South Pacific islands. The water is analysed for such characteristics as hardness, calcium and magnesium content, pH, conductivity and trace element content.

4.26 Proceedings of three meetings organized jointly by WHO and the International Society of Cardiology

in 1971 have now been published.^{1, 2, 3} They provide a comprehensive critical review of current knowledge of functional and morphological changes in the heart muscle, an outline of certain outstanding problems and a number of suggestions for future work.

4.27 For several years, WHO has been interested in the effects of high altitude on cardiovascular function. It has been shown by collaborating institutes in Peru that hypertension is less common among people living at high altitude than among those living in the lowlands and that cellular changes play an important part in adaptation to high altitude. A meeting on the physiology, pathophysiology and medicosocial aspects of cardiovascular disease was held by WHO in La Paz in July, in collaboration with the Pro-Bolivia Foundation and the Bolivian Institute of Altitude Biology. The aim was to bring together investigators actively engaged in high altitude studies to review the whole range of current knowledge in this field and to propose a programme of internationally coordinated research with a view to improving the health of populations living and working at high altitude and clarifying the pathogenesis of their "lowland diseases". The subjects of discussion included: the genetic and immunological aspects of life at high altitude, cardiovascular physiology and pathophysiology, the pathophysiology of respiration, and metabolic and enzymatic processes at high altitude. The participants came from Belgium, Bolivia, Chile, France, Switzerland and the United Kingdom.

4.28 Further progress has been made in studies of the cellular metabolism and enzymatic action that appear to be responsible for the adaptation of the myocardium to high altitude hypoxia. Investigations have been carried out in collaborating laboratories in Geneva (Switzerland) and Toulouse (France) on rats exposed to high altitude conditions in the Jungfrau region of Switzerland. In the first series of experiments, performed in 1971, enzymes involved in glycolysis (aldolase, phosphokinase and lactic dehydrogenase) and the pentose cycle (glucose-6-phosphate-dehydrogenase) were investigated, as well as succinate dehydrogenase, an indicator of the oxidative activity in the mitochondria. In a second series, in 1972, further enzymes were studied. Stimulation of glycolysis in the cytoplasm seems to precede increased

oxidative metabolism in the mitochondria, which appears only after 3 months' exposure to high altitude. The biochemical changes were confirmed by morphological studies with the electron microscope. The findings for male and for female rats differed, and investigations are continuing, both in the Jungfrau region and in La Paz, in cooperation with the Bolivian Institute of Altitude Biology.

4.29 It is important to assess habitual physical activity and its relationship to coronary heart disease. Direct methods are, of course, available for measuring such factors as levels of energy expenditure, the aerobic component from oxygen consumption and the anaerobic component from blood lactate levels. The indirect methods, which are less precise but easier to apply on a large scale, include activity recall questionnaires, the use of pedometers or accelerometers for measuring the movement of the larger muscles, dietary surveys, the measurement of deep body temperature and continuous recording of the heart rate. Questionnaires and heart-rate recording seem to be the most suitable means available at present for assessing habitual physical activity in different groups, including persons recovering from myocardial infarction. WHO has sponsored the development at the Federal Polytechnic School, Lausanne, Switzerland, of a miniaturized heart-rate counter, capable of discriminating six levels of physical activity.

4.30 *Cardiomyopathies* are conditions of varying, frequently unknown etiology, in which the dominant feature is cardiomegaly and cardiac failure. They do not include heart diseases related to systematic or pulmonary hypertension, coronary heart disease or diseases resulting from damage to the valvular structure of the heart. For several years WHO has promoted and assisted investigations into cardiomyopathies with a view to clarifying their etiology and finding effective methods of treatment and prevention. Studies in various parts of Africa and in the Caribbean area have shown that, when the condition is established and irreversible, diagnosis is relatively easy. Even then, it is not always easy to distinguish between cardiomyopathies and such conditions as hypertension and rheumatic heart disease. Moreover, although information is available on cardiomyopathies encountered in the hospitals and outpatient departments, there are no population-based data on their prevalence and their natural history is unknown.

4.31 In 1972 the WHO interregional team for field research on cardiovascular diseases, together with other workers at the WHO Research and Training Centre for Cardiovascular Diseases, Kampala,

¹ Maseri, A., ed. (1972) *Myocardial blood flow in man: methods and significance in coronary disease*, Milan, Il Ponte.

² Moret, P. R. & Fejfar, Z., ed. (1972) *Metabolism of the hypoxic and ischaemic heart*, Basel, Karger.

³ Zanchetti, A., ed. (1972) *Neural and psychological mechanisms in cardiovascular disease*, Milan, Il Ponte.

started a survey on the prevalence of endomyocardial fibrosis and rheumatic heart disease in Uganda and neighbouring countries and continued a clinical study of idiopathic cardiomegaly with the aim of determining its natural history.

4.32 A cardiac registry, set up with assistance from WHO, has been in operation at University College Hospital, Ibadan, Nigeria, since 1965. Pathological, clinical, radiological and epidemiological data are being collected on about 1000 patients attending the outpatient clinic or admitted to the hospital. The diseases most commonly recorded are hypertensive heart disease, endomyocardial fibrosis, primary myocardial disease, and rheumatic heart disease. Myocardial biopsy, a non-invasive technique for measuring myocardial contractility, and estimations of potassium balance and transketolase activity are employed in the clinical studies. A cardiovascular disease survey is being carried out in selected areas of Nigeria.

4.33 A WHO-assisted study on peripartum cardiac failure is in progress in Zaria, Nigeria. The condition seems to be common only in the neighbourhood of Zaria and is particularly frequent in women who have given birth to twins; the incidence rises with parity. To date, 224 patients have been examined clinically. Massive fluid retention, transient hypertension and a rapid response to treatment are common. In some women the heart remains abnormally enlarged after recovery from the acute phase, and relapses, sudden death and late hypertension may also occur. The syndrome appears to be a primary cardiomyopathy precipitated by postpartum hypertension, salt loading, or the two together.

4.34 The WHO collaborating laboratory in the Hadassah Medical School, Jerusalem, has continued its research on experimental cardiomyopathy, carrying out histological and electron microscope investigations and studies of cultured myocardial cells.¹

4.35 The WHO International Reference Centre for Lipid Determination in Cardiovascular Research in Atlanta, Ga., USA, has extended its programme to include the standardization of serum triglycerides. A WHO regional reference laboratory was established in the Institute of Clinical and Experimental Medicine, Prague, to assist in the constantly expanding programme of collaborative studies on atherosclerosis in Europe.

4.36 A collection of 250 electrocardiographic tracings, representative of common cardiovascular conditions, has been assembled by the Organization and is available to interested workers. It is hoped that it will serve to promote greater uniformity in the coding of electrocardiograms in collaborative epidemiological studies.

4.37 In 1968, a long-term programme was launched in the European Region in view of the increase in morbidity and mortality from cardiovascular diseases there. At the outset the emphasis was on ischaemic heart disease, but for its second five years the programme has been extended to include cerebrovascular diseases, hypertension, rheumatic heart disease, congenital heart malformations and chronic lung diseases leading to cor pulmonale. In preparation for the extended programme, there was a considerable expansion of activities in the whole field of cardiovascular diseases in Europe during 1972. At the Sixth European Congress of Cardiology, held in Madrid by the European Society of Cardiology in September, WHO organized a symposium on its work in cardiovascular diseases.

4.38 The Organization cooperated with the International Society of Cardiology and its regional societies in preparations for World Health Day and World Heart Month, in the organization of an exhibition at the Sixth European Congress of Cardiology (Madrid, September) and in arrangements for the first Asian seminar on cardiovascular epidemiology (Singapore, September).

4.39 World Health Day 1972 was devoted to the theme of prevention, with the slogan "Your Heart is your Health" (see paragraphs 14.1-14.5). On this occasion an Institute of Cardiology was inaugurated at Madras, India. WHO helped to prepare the programme of the new institute, which is expected to become a national centre for training, services and research. The medical and surgical aspects of the principal cardiovascular conditions and epidemiological studies of rheumatic fever and of the peripheral vascular diseases will be given priority in the research programme. The inauguration of the institute was followed by a three-day scientific meeting, in which WHO participated, when leading cardiologists from different centres in India discussed problems relating to ischaemic heart disease, hypertension, cardiovascular emergencies, heart disease and general practice, rheumatic fever and rheumatic heart disease.

¹ Details of research on cardiovascular diseases in animals will be found in paragraphs 1.238-1.239.

Cancer

4.40 The WHO programme in cancer does not seek to duplicate the vast amount of work on this subject that is done throughout the world but rather to concentrate on those aspects for which its unique international character particularly suits it. Among these are assistance and advice to governments in the organization of cancer control services; the coordination of studies carried out by different institutions (often in close collaboration with international non-governmental organizations such as the International Union against Cancer); the international evaluation of new developments in oncology and dissemination of information on those of particular value; and the promotion of cancer control programmes, particularly through the wide application of the best diagnostic methods for early detection and of therapeutic and educational techniques. The International Agency for Research on Cancer (IARC) carries out a programme of research into factors in the environment involved in the etiology of human cancer.

4.41 In the African Region, an intercountry programme has been started for assistance in the study of various aspects of cancer, including its epidemiology, and for the preparation of guidelines on its control. Zambia was the first recipient of such assistance in 1972. The facilities of the Zambia University Teaching Hospital in Lusaka were surveyed with a view to establishing and equipping a radiotherapy unit. The Government of Zambia also received assistance for a review of the country's facilities for cancer chemotherapy and surgery. Information is being provided to the Organization by the health services and the academic and research centres in Cameroon, Ivory Coast, Kenya, Liberia, Nigeria, Senegal, Uganda, United Republic of Tanzania, and Zaire on the efforts they are making in cancer control.

4.42 In the Region of the Americas, the Organization gave support to a cervical cancer control programme in Trinidad and Tobago which included the continuation of a cytotechnology training course for eastern Caribbean countries, and to the Regional School of Exfoliative Cytology for Central America and Panama, located in Guatemala. Chile received assistance for the cervical cancer control programme in Santiago, and for expanding the service and training facilities to other areas of the country; in Peru support was given to the cervical cancer control programme in the Lima metropolitan area, which is serving increasingly larger segments of the country's population at risk. The nationwide cancer control programme in Brazil, which includes setting up

cytology laboratories, improving cancer registries, and promoting better radiation therapy practices, was also assisted. In Cuba, further advances have been made in setting up tumour registries throughout the island and in cervical cancer control activities.

4.43 As part of an interzone project on health and population dynamics, a manual of norms and procedures for cervical cancer control has been prepared, which gives specific guidelines on organization, administration, field and laboratory practices, clinical decisions, follow-up, statistical reporting and evaluation.

4.44 A working party on the training of personnel in physics as applied to radiation therapy was convened by the Organization in Brazil; it made recommendations on the responsibilities and functions of this specialized staff, and on appropriate teaching curricula, within the framework of developing countries. The field work was completed in a survey on smoking patterns in Latin American cities; the processing and analysis of the data collected have begun, and it is expected that the results will provide a sound basis for the planning and evaluation of programmes to control cigarette-smoking.

4.45 In the South-East Asia Region, the pilot project for the control of cervical and oropharyngeal cancer in Kancheepuram, near Madras, India, has been receiving assistance from WHO and from the Norwegian Government, and is intended to provide a model for the development of cancer control activities as an integrated service within the existing health services in developing countries. During the year the cancer institute building was completed; the laboratory services have been organized and health education programmes developed; steps are being taken to improve treatment facilities. Further assistance was also given by the Organization to the Oncological Dispensary at Ulan Bator, particularly in connexion with facilities for early detection of cancer of the cervix and epidemiological studies on liver and oesophageal cancer.

4.46 In the European Region many countries have been showing increasing interest in the control of cancer. A working group on comprehensive cancer control programmes met in Oslo in November, when an evaluation was made of the experience in various European countries during the past 10 years. The place of cancer control services in the framework of the general health services and the role of cancer registries in comprehensive cancer control were discussed. Assistance, with UNDP financial support, was given in Albania to the Institute of Oncology,

Tirana, in the form of equipment. Advice was also given to Yugoslavia on the organization of cancer control services.

4.47 In the Eastern Mediterranean Region, emphasis during the year was placed on the importance of education both of the public and of the health professions for the prevention and early detection of cancer. The preventive aspects can usefully be fostered through the mass information media and by the introduction of public education material in the school curricula. Suitable subjects for health education in cancer prevention in this Region are the dangers of smoking (lung cancer), schistosomiasis prevention (urinary bladder cancer) and the effects of prolonged exposure to sunlight (skin tumours). Preliminary steps were taken towards the investigation on a regional basis of a gastrointestinal lymphoma that presents certain unusual features (see also paragraph 5.6).

4.48 In the Western Pacific Region the number of deaths reported to be due to cancer appears to be increasing in many countries; little is known about the magnitude of the problem, however, and the existing facilities for diagnosis and treatment need to be surveyed. WHO assisted Fiji and the Republic of Viet-Nam to collect such information, to examine the feasibility of creating a cancer control service and to recommend appropriate control methods.

4.49 As in the past, the Organization maintained collaboration with the International Union against Cancer in numerous ways. An example is the co-operation with the Union's Committee on Controlled Clinical Trials in the collection, analysis and dissemination of information about current therapeutic trials in cancer and their methodology. The Union publishes periodically a list of such trials. For the present these data are collected in respect of the Regions of the Americas and of Europe. In view of the fact that in a number of countries malignant neoplasms now rank second or third among the causes of death in childhood, consideration is being given jointly by WHO and the Union to a programme for cancer control in children.

4.50 To improve the quality and comparability of data collected in existing hospital-based cancer registries and to allow the useful introduction of such registries in new cancer institutions, the Organization has continued its efforts to promote standardized data-recording. A form designed to allow a wide range of information items to be uniformly collected and noted by any hospital-based registry, and to permit retrieval of that information either manually from punch-cards or by more sophisticated techniques,

was devised during the year. It was reviewed at a consultation held in December, with a view to testing it in practice over a six-month period in ten cancer institutes.

4.51 The fact that there is an association between the presence of fetal or carcinoembryonic antigens and certain types of tumour suggests that by monitoring for such antigens it might be possible to detect these tumours very much earlier than is now the case. WHO is supporting a collaborative study by five university hospitals in Switzerland to clarify the potential usefulness of this immunological tool (see also paragraph 4.67).

4.52 Collaborative clinical studies at an international level are coordinated by four WHO international reference centres concerned with melanoma, breast cancer, ovarian cancer, and stomach cancer. These centres also publish at regular intervals analytical reviews of recent publications in their respective fields. During the year, the International Reference Centre for the Evaluation of Methods of Diagnosis and Treatment of Melanoma, Milan, Italy, concluded a clinical trial on the prophylactic dissection of regional lymph nodes and related problems in melanoma patients. For the statistical evaluation of the data use is being made of the computer facilities available to WHO. Information on melanoma collected over the past five years by this reference centre and its 27 collaborating institutions is being used in an attempt to determine whether screening of pigmented premalignant lesions in the general population can serve to define a high-risk group for melanoma. For cost/benefit reasons early detection programmes have tended to be limited to high-risk population groups; however, there may be many different definitions of high-risk groups for any given cancer site, and for most sites the definitions are not at all clear-cut.

4.53 The International Reference Centre for the Evaluation of Methods of Diagnosis and Treatment of Breast Cancer, Villejuif, France, is continuing its studies to compare the effectiveness of simple and radical mastectomy, with particular emphasis on a surgical clinical trial aimed at the preservation of the breast. At the International Reference Centre for the Evaluation of Methods of Diagnosis and Treatment of Ovarian Cancer, Leningrad, USSR, evaluations of different diagnostic and therapeutic procedures are in progress. Use is made of special registration cards for patients that have been designed by the centre to permit an assessment based on uniformly collected information. There is very close collaboration between this centre and the International Reference Centre for the Histological Classification of Ovarian

Tumours in the same city; the diagnosis of material received at the latter for histopathological classification is done at the diagnosis and treatment centre, whose own material is also contributed to the pool of specimens used for classification purposes.

4.54 There are important differences in the clinical staging of stomach cancer used in different parts of the world, and notably in Japan, Europe and the USA. The International Reference Centre for the Evaluation of Methods of Diagnosis and Treatment of Stomach Cancer, Tokyo, is therefore seeking, with its collaborating centres, to establish an agreed clinical staging that could be more widely adopted. Collaborative work carried out in 1972 was based upon diagnostic techniques agreed upon at a three-week course on the X-ray diagnosis and endoscopic diagnosis of early stomach cancer that the centre organized for its collaborators in December 1971.

4.55 The use of exfoliative cytology is accepted as one of the most useful tools for the early detection of many types of cancer. The development in many countries of national family planning programmes provides an additional opportunity for cytological cancer monitoring among women, and, as noted in the Annual Report for 1971,¹ the Organization has embarked upon an interregional training programme in exfoliative cytology and gynaecological and obstetrical pathology in relation to family planning programmes; this receives support from UNFPA. In November-December an introductory six-week course in exfoliative cytology of the female genital tract was held in Teheran for pathologists from the Eastern Mediterranean Region. It was organized in collaboration with the International Academy of Cytology.

4.56 The International Reference Centre for Nomenclature in Cytology, having completed for publication its work on the standardization of the cytological nomenclature on the female genital tract, has expanded its activity to the terminology applicable to the cytology of the breast, lung, bladder, body fluids, and such organs as the prostate in which the technique of aspiration cytology is used diagnostically.

4.57 A donation to the Voluntary Fund for Health Promotion has been made by the National Cancer Institute through the National Academy of Sciences in the USA to accelerate the Organization's programme for the international histological classification of tumours. This made possible some of the year's activities described in the following paragraphs.

4.58 Three of the WHO international reference centres for the histological classification of tumours held meetings with their collaborators during the year. In July, those participating in the work of the International Reference Centre for Comparative Oncology, Washington, D.C., met in Geneva to discuss the classification and nomenclature of tumours of domestic animals and the relationship between these and the tumours seen in man (see also paragraph 1.235). In October, the group working with the International Reference Centre for the Histological Classification of Thyroid Tumours met at the Centre's premises in Zurich, Switzerland, and finalized the classification on which they have been working since 1964. This is now being prepared for publication. In November, a review meeting was held in Tokyo by the International Reference Centre for the Histological Classification of Gastro-oesophageal Tumours. Such tumours are being increasingly detected at an early stage as a result of important developments in gastroscopy.

4.59 The histological classification of precancerous and pre-invasive lesions was considered, in Geneva in November, at a meeting of the heads of the international reference centres dealing with the histological classification of tumours of the skin, stomach, uterus, eye, bladder and oral cavity, with particular reference to the similarities and differences of premalignant and pre-invasive lesions as they occur in these different sites.

4.60 Volumes representing the work of two other centres were published during the year in the *International Histological Classification of Tumours* series—dealing with the histological typing of bone tumours¹ and of salivary gland tumours.²

4.61 Four new international reference centres for histological classification were established during the year. These are the International Reference Centre for the Histological Classification of Tumours of the Liver, Biliary Tract and Pancreas, at the Department of Pathology, University of Hong Kong; the International Reference Centre for the Histological Classification of Upper Respiratory Tract Tumours, at the Department of Pathology, University of Singapore; the International Reference Centre for the Histological Classification of Eye and Orbit Tumours, at the Armed Forces Institute of Pathology, Washington,

¹ Schajowicz, F. et al. (1972) *Histological typing of bone tumours*, Geneva, World Health Organization (*International Histological Classification of Tumours*, No. 6).

² Thackray, A. C. & Sobin, L. H. (1972) *Histological typing of salivary gland tumours*, Geneva, World Health Organization (*International Histological Classification of Tumours*, No. 7).

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 3.38.

D.C.; and the International Reference Centre for the Histological Classification of Endocrine Tumours, at the Department of Pathology, Welsh National School of Medicine, Cardiff, United Kingdom. These bring to 23 the total number of such international reference centres that have been designated in the Organization's efforts to develop an internationally acceptable histological classification of tumours to facilitate communication between pathologists, clinicians, epidemiologists and statisticians. Together with their collaborating institutions, these centres represent more than 250 pathologists in almost 50 countries.

*International Agency for Research on Cancer (IARC)*¹

4.62 The International Agency for Research on Cancer (IARC) continued its studies on the environmental factors that may be involved in the etiology of cancer in man. During the year, the Agency itself collected data relating to a wide range of types of cancer from many different parts of the world; considerable efforts were made to involve national organizations in these studies, and the total of more than 70 research agreements concluded gives some indication of the extent of the coordinating activity of the Agency.

4.63 The foundation of virtually all the Agency's programmes is epidemiological studies, and if such studies are to be internationally valid and the results from all countries comparable, the methods of data collection must be standardized and the classifications used in the studies internationally agreed. The Agency therefore devoted much time during the year to the improvement of the comparability of epidemiological data and, together with WHO headquarters, to the preparation of proposals for the neoplasm chapter of the ninth revision of the International Classification of Diseases. This work was greatly assisted by close cooperation with national cancer registries through the International Association of Cancer Registries, in the work of which the Agency plays an active role.

4.64 While modern epidemiological techniques continue to make for the improved collection of human data, even with the sensitivity of recently developed analytical techniques the task of quantifying potential carcinogens in the human environment is proving more complex than might have been thought. The Agency is responsible for coordinating a study on analytical methods for nitrosamines in conjunction with the International Union of Pure and Applied Chemistry.

The aim is to establish reliable and reproducible methods that are sufficiently sensitive to identify and quantify very small amounts of different nitrosamines present in foodstuffs; refinement of gas-chromatographic techniques made at the Agency's own laboratories is already leading to a considerable improvement in the methodology. The Agency's chief collaborating institution in this programme is the Institute for Experimental Toxicology and Chemotherapy, Heidelberg, Federal Republic of Germany. The research in this study will provide tools for the determination of at least some of the environmental factors that will be sought in the large-scale field programme set up to study oesophageal cancer in Iran, referred to in paragraph 4.72. In addition, laboratory studies sponsored by IARC on the metabolism of nitrosamines and the mechanism by which oesophageal cancer can be experimentally induced by these compounds are continuing and promise to provide useful data to back up the field studies. A comprehensive review of methods for the accurate analysis of nitrosamines has been published.²

4.65 *Liver cancer.* The IARC Research Centre at Nairobi, having demonstrated in Kenya that there is a parallelism between the ingestion of aflatoxin and liver cancer rates, broadened its studies to include areas in Ivory Coast, Singapore and Swaziland, in order to put the strength of the association to further proof and to test the reproducibility of the aflatoxin analyses.

4.66 Collaboration for other studies on hepatocellular carcinoma in Africa was established with clinico-pathological teams working in Ethiopia, Ghana, Kenya, Nigeria and Uganda, and a meeting of the collaborators was held in August in Ibadan, Nigeria. An important aspect of these studies is the development of standard methods for detection of hepatitis B antigen, which is present in 40% of African and Asian patients with hepatocellular carcinoma, in contrast to 5-10% of the general population. There has long been speculation as to the role of hepatitis in chronic liver disease and cancer, and there is now a possibility of defining the parts played by this factor and by aflatoxin consumption in the etiology of liver cancer.

4.67 *Immunology of cancer* (see also Chapter 5). The application of immunological techniques has been vital for the diagnosis of primary liver cancer. The use of the α_1 -fetoprotein test mentioned in the Annual

¹ Further details of the Agency's work during the period under review will be found in the Annual Report of its Director for 1972-73 (in preparation).

² Bogovski, P. et al., ed. (1972) *N-nitroso compounds: analysis and formation*, Lyons, International Agency for Research on Cancer (IARC Scientific Publications, No. 3).

Report for 1971¹ has been continued and work in the Agency has greatly improved the standardization of the serological assay. Standard samples of α_1 -feto-protein have been prepared, and the 4000 ampoules are being controlled for stability under various conditions of storage, after which they will, if suitable, be distributed to the various centres engaged in this work, providing a basis for the reporting of standardized data from all centres. Improvements have also been made in IARC in the technique itself by the introduction of a radioimmunoassay using iodine-135. This assay is some 1000 times more sensitive than the standard immunodiffusion technique. In collaboration with the University of Dijon, France, the Agency is also investigating the use of quantitative measurement of carcinoembryonic antigen in lung tumours in man as a potential aid in early diagnosis.

4.68 Cell-mediated immunity in cancer patients and in normal populations in Africa has been investigated at the IARC Research Centre, Nairobi, where active collaboration is being established with the new WHO Immunology Research and Training Centre there (see paragraph 5.4). *In vitro* stimulation tests of preserved lymphocytes from field projects have been established and these techniques are being extended to the Burkitt's lymphoma study in Uganda mentioned below.

4.69 *Cancer of the prostate.* The pilot phase of an international collaborative study to determine whether latent carcinoma of the prostate is of the same frequency in necropsy material in areas of different prostatic cancer mortality and incidence was completed during the year and the main study begun. Seven centres in Africa, Asia, the Caribbean and Europe are collaborating in the study and so far nearly 200 cases have been submitted. Microscope slides of pathological material from these cases are distributed for "blind" reading by all participants.

4.70 *Lung cancer and mesothelioma.* An investigation by the Singapore Cancer Registry, which is financially supported by IARC, has shown that lung cancer rates in Cantonese Chinese women in Singapore are at least double those in women in the United Kingdom and the USA. A case-control study is under way to determine whether causal factors other than cigarette-smoking are likely to be involved.

4.71 Since 1967, IARC has been participating in an international project on mesotheliomas and other cancers due to asbestos dust that is directed by the Pneumoconiosis Research Unit of the Medical

Research Council of the United Kingdom. In October 1972 the Agency, in conjunction with the Pneumoconiosis Research Unit, organized an international meeting in Lyons to review the progress made. It was considered that the greatest risk from asbestos is faced by workers in the processing industries, especially in asbestos textile manufacturing where the spinning process produces a great deal of fine dust. Workers in other industries using asbestos are likely to be slightly less at risk since they usually handle asbestos in a wet form which is consequently less dusty. Workers in the mining industry and those who work in the asbestos mills where the mineral is broken down prior to industrial processing are at risk, but at a lower level than those in the processing industries.

4.72 *Oesophageal cancer.* Following the completion of a pilot study, the IARC Research Centre in Teheran, in collaboration with the Institute of Public Health Research and the Institute of Nutrition in that city, has begun the survey of village and personal characteristics on the southern littoral of the Caspian Sea. The aim of the survey is to make a detailed study of the immediate environment of the population in areas of widely differing incidence of oesophageal cancer, noting their personal habits and characteristics, occupations, and dietary patterns. Specimens of blood and urine are being collected for analysis, and samples of food will be examined for potential carcinogenic content. These analyses will be carried out in Teheran, in IARC, and in other collaborating laboratories.

4.73 Data collection for case-control studies of oesophageal cancer has been completed in Jamaica and at the IARC Research Centre in Singapore. Preliminary analysis of the Singapore data confirms a higher risk of this type of cancer in the Hokkien (Fukien) and Teochew (Taochow) population groups than in other Chinese groups in Singapore. Another case-control study is continuing in France (Brittany), in collaboration with the Institut national de la Santé et de la Recherche médicale, to test the hypothesis that the extremely high mortality rates from oesophageal cancer reported from that area are related to the consumption of strong alcoholic drinks, distilled cider in particular.

4.74 *Nasopharyngeal cancer.* Study of the association between a herpesvirus (Epstein-Barr virus; EBV) and nasopharyngeal cancer continued, with the collection of sera from cancer patients and randomized samples of the normal population in Hong Kong and Singapore, and also in France (Lyons). It is estimated that it may take two to three years to establish whether

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 3.56.

or not the association of the virus has an etiological significance for the cancer.

4.75 *Burkitt's lymphoma.* A prospective seroepidemiological survey among African children in West Nile District, Uganda, was begun in 1971 in collaboration with the East African Virus Research Institute in order to investigate whether EBV infection is also a necessary precursor of the development of Burkitt's lymphoma.¹ Blood samples have been taken so far from 10 000 children, representing well over 90% of the eligible children in the area covered to date. The sera are stored in Lyons for future immunological study. Environmental data are being collected at the same time as the sera, covering such parameters as topography, housing conditions, sources of water, crop cultivation, dietary patterns, and variations in rainfall. Since malarial infection has been postulated as a co-factor with EBV infection in the causation of Burkitt's lymphoma, a detailed epidemiological study of malaria in the area is also being carried out.

4.76 *Transplacental carcinogenesis.* Experimental investigations of transplacental carcinogenesis carried out by the Agency in collaboration with the National Institute of Applied Sciences in Lyons, France, are continuing, with particular reference to the effect of methylcholanthrene. Much of the knowledge gained in these studies and other aspects of transplacental carcinogenesis are covered in the proceedings of a meeting convened by IARC in conjunction with the Medizinische Hochschule, Hanover, Federal Republic of Germany, and the European Committee for the Protection of the Population Against the Hazards of Chronic Toxicity (EUROTOX).² Partly as a result of a recommendation made at that meeting, an epidemiological survey on childhood cancer is envisaged in conjunction with the cancer control programme in children referred to in paragraph 4.49.

4.77 *Pesticides.* As is reported in paragraph 3.45, the long-term experimental studies of the effect of administering DDT to rodents have confirmed that prolonged high doses of DDT produce an increase of liver tumours, some of which are malignant, in the two strains of mice used in the experiments, although

a cumulative transgenerational effect remains unproven. Evidence of any obvious relation between cancer patterns in populations and levels of DDT or its metabolites in human fat has not been found.

4.78 *Evaluation of potential carcinogens.* The Agency was asked by its Governing Council at its ninth session, in October 1971, to be prepared to provide national authorities with expert, independent scientific opinion on environmental carcinogens. Under the aegis of the IARC Advisory Committee on Environmental Carcinogenesis, a working group composed of internationally recognized experts in the field of chemical carcinogenesis has prepared a series of monographs summarizing the evidence for the carcinogenicity of a number of individual chemical substances or groups of substances. The first volume, of 19 monographs, covering inorganic substances, organic compounds and natural products, was published during the year.³

4.79 *Host-environment interactions.* In August, the Agency, in collaboration with the Fogarty International Center at the National Institutes of Health, Bethesda, Md., USA, and the League for the Fight Against Cancer of the Socialist Republic of Croatia, Yugoslavia, organized jointly with the Central Institute for Tumours and Allied Diseases, Zagreb, Yugoslavia, a meeting on host-environment interactions in the etiology of cancer in man. The aim of the meeting was to bring together epidemiologists and experimental workers studying the chemical and biological aspects of the human environment in order to foster an interdisciplinary approach.

4.80 *Training programme.* Eleven research training fellowships and 15 travel fellowships were awarded in 1972 in the Agency's fellowships programme.

Mental health

4.81 At least 1% of any population is incapacitated by severe mental disorder at any given time, and 10% are so affected at some period during their lives. The magnitude of this problem and the urgent need to extend mental health services are becoming more widely recognized. Important recent advances in treatment and in the delivery of services have improved the prognosis for mental patients, so that many can be treated as outpatients and their condition considerably improved within a few months. Severe deterioration, hitherto usually associated with custodial

¹ A full account of oncogenic herpesviruses in man and in other animal species appeared during the year with the publication of the proceedings of the symposium jointly organized in 1971 by IARC and the Houghton Poultry Research Station in the United Kingdom:

Biggs, P. M. et al., ed. (1972) *Oncogenesis and herpesviruses*, Lyons, International Agency for Research on Cancer (IARC Scientific Publications, No. 2).

² Tomatis, L. & Mohr, U., ed.: *Transplacental carcinogenesis*, Lyons, International Agency for Research on Cancer (IARC Scientific Publications, No. 4) (in press).

³ International Agency for Research on Cancer (1972) *IARC monographs on the evaluation of carcinogenic risk of chemicals to man. Volume 1*, Lyons.

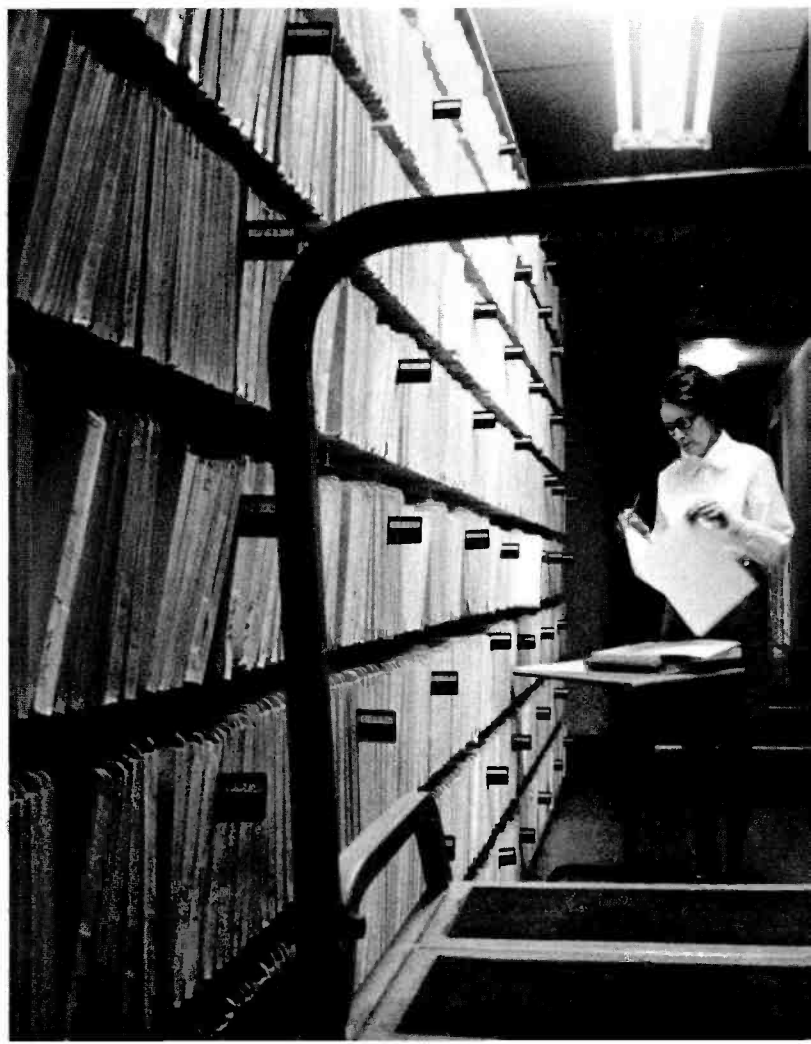
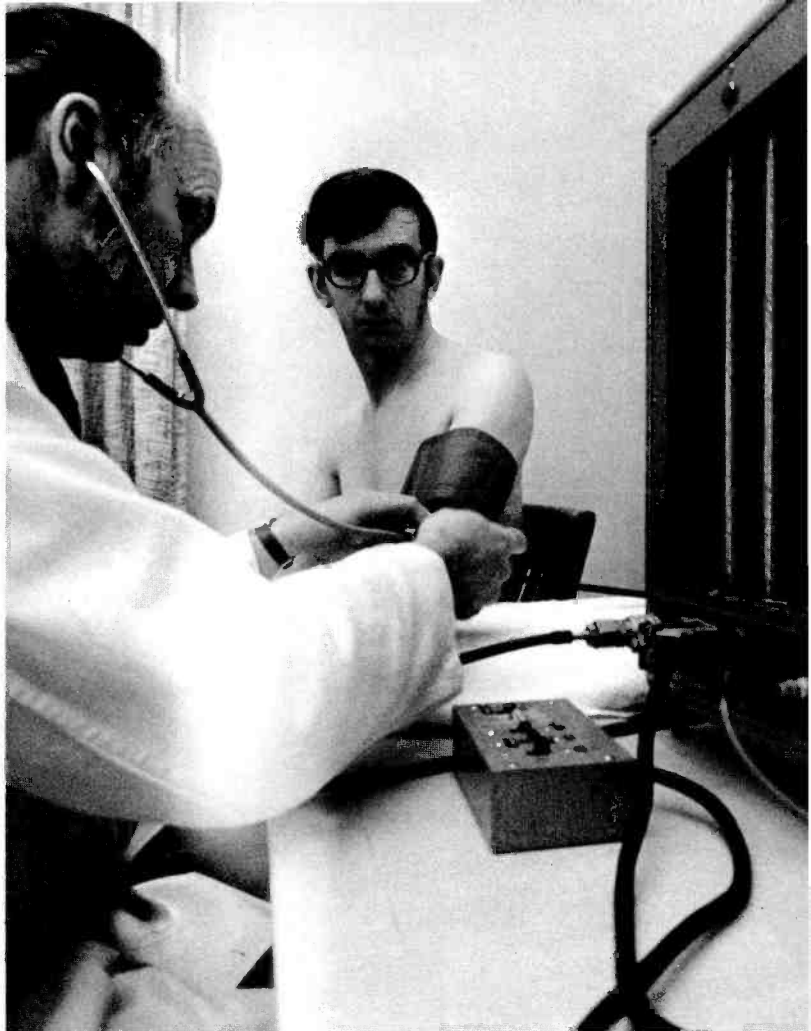
Cardiovascular diseases

WHO'S programme in cardiovascular diseases gives priority to preventive measures, which include the systematic examination of large sectors of populations.

At right: Blood pressure measurements are more objective when made with semi-automatic apparatus.

Below: Respirometer tests to evaluate cardiovascular status.

Below, right: Cardiovascular disease registers are essential in systematic prevention programmes.

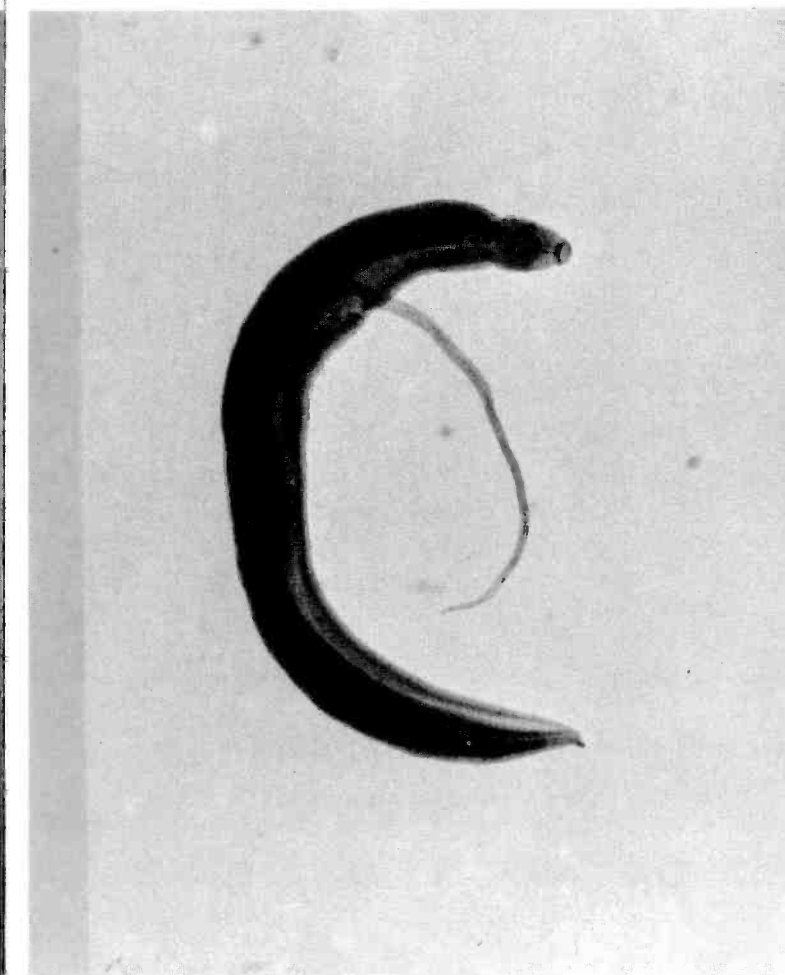
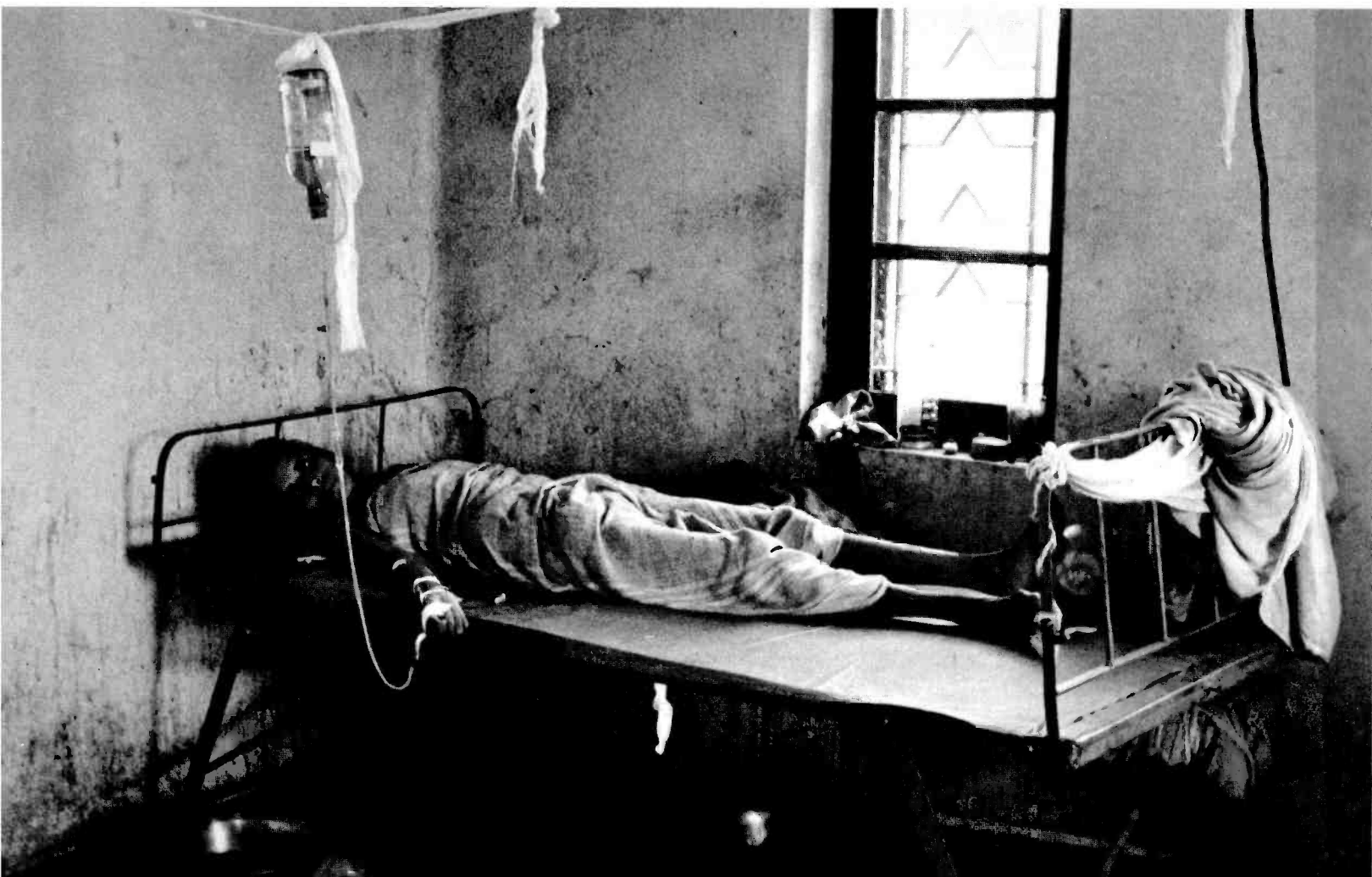




Cholera

At left: To help fight cholera in emergencies, WHO has arranged for the dispatch of considerable quantities of medical supplies.

Below, left: An emergency station in India for the rehydration of cholera patients.

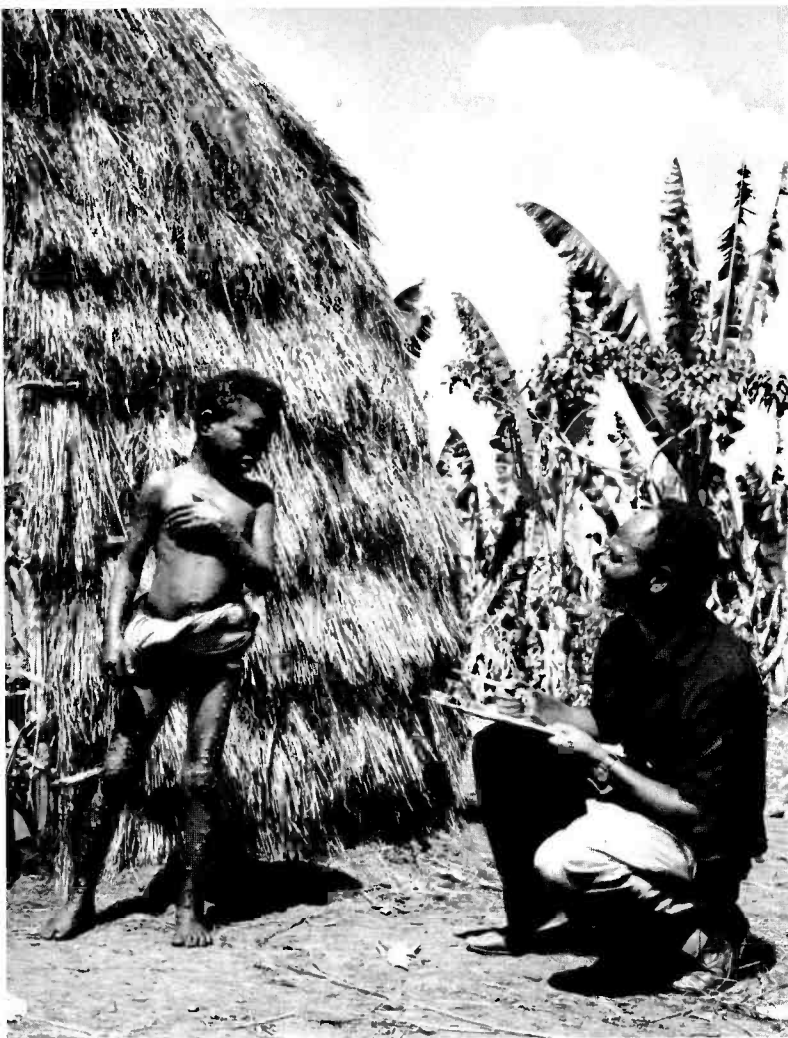


Schistosomiasis

Transmitted by aquatic and amphibious snails, this disease is spreading in the wake of schemes for developing water resources.

Above: Heavy infection, with liver and spleen enlargement, retards physically and mentally.

Left: Paired male and female schistosomes, the parasites causing the disease.



Smallpox

Smallpox eradication campaigns have already confined the disease to a few countries of endemicity, in most of which incidence is being rapidly reduced.

At left: A member of a surveillance team asks a young smallpox patient in Ethiopia about his contacts.

Below, left: Gaining the support of villagers for the campaigns in the Americas, whence no case was reported in 1972.

Below: In 1965, the WHO epidemiological surveillance unit was still receiving numerous notifications of smallpox-infected areas in West Africa. No case has been reported there in the last two years.



care in psychiatric institutions, can now to a large extent be prevented. A major task of the WHO mental health programme is to stimulate the application of these advances so as to reach a higher proportion of the large numbers of the mentally ill in need of care.

4.82 In view of this, the programme has concentrated on the following major areas: planning, organization and administration of mental health services; standardization of psychiatric diagnosis, classification and statistics; education and training; research on specific mental disorders; and biological psychiatry and neurology.

4.83 In all WHO Regions, attention has been given to the need for close integration of the mental with the general health services, and to the development of comprehensive mental health services that meet the demands of the community they serve by providing a wide range of facilities. Within the long-term programme in the European Region several meetings were organized concerned with mental health services. A conference on comprehensive psychiatric services and the community took place in Peebles, United Kingdom, in May. The conference brought together, from 27 countries, public health administrators, psychiatrists, general practitioners, social workers, nurses and educators, as well as representatives of the International Council of Nurses, the World Federation for Mental Health, the World Federation of Occupational Therapists, the World Psychiatric Association and the International Council on Social Welfare. It was a continuation of a series convened in recent years in the Region to consider the implication of the current trend towards care of the mentally disordered in the community wherever possible rather than in socially isolated mental hospitals. Despite strong support for these trends on the part of professional mental health workers, the development of community mental health services is being impeded in many countries by economic, social, professional and other constraints. At the same time there is a need for a clear formulation of goals, and the introduction of evaluative measures as a basis for policy decisions and planning.

4.84 The conference discussed the extent to which the community should participate in the development and operation of its mental health services, and considered the problems encountered in coordinating mental health services within the total health care system of a community. It is imperative to establish a realistic balance between demands and resources, and in this context the participants discussed the

contribution of social and welfare services and voluntary associations in shaping the pattern of comprehensive mental health services.

4.85 A European Region working group on the role of the social worker in psychiatric services met in Nice, France, in September. The special contribution of various members of a multidisciplinary psychiatric team, their professional relationship with other team members, and their training requirements in the light of modern trends in the structure and organization of mental health services—all matters of considerable concern in view of the universal shortage of professional staff—were the main topics discussed. This meeting is one of a series on the contribution of specific categories of personnel to the operation of mental health services.

4.86 As a basis for the planning and evaluation of mental health services, data need to be adequately collected and utilized. As part of the long-term mental health programme on data collection and classification in the European Region, a training course on mental health epidemiology and statistics was held in French for psychiatrists and statisticians; it was based on a similar course in English held in 1971. The purpose was to assist in improving the administration of national mental health services by bringing together psychiatrists and statisticians to discuss common problems in the effective operation, organization and planning of these services.

4.87 Another European working group met in March in Barcelona, Spain, to consider data collection and classification of services for the mentally retarded. There is a wide discrepancy between countries in the European Region in the social, educational and economic provisions they make for the mentally retarded, only a small proportion of whom are in need of institutional care with full medical and nursing attention. The meeting considered the organization of psychiatric services and their coordination with other services at a local and national level. There is also a general dearth of information on the resources available for the mentally retarded and on the use made of them; the meeting agreed upon the form and content of a set of schedules which would yield comparable information on the staffing and structure of services, and would provide some indication of national responses to the needs of this underfavoured section of the population.

4.88 A meeting of mental health specialists of the Eastern Mediterranean Region was held in September in Alexandria at which views were exchanged on mental health problems and needs in countries of the

Region, and a proposed programme was drawn up for future regional activities. In preparation for the meeting, a questionnaire was sent to all countries in the Region, designed to provide information on current organizations, facilities and manpower resources in mental health services. Analysis of the data showed that there is a serious shortage of manpower in this field, accompanied by defects in training programmes. Moreover, the establishment of community-based centres and the development of effective methods for rehabilitation and for the management of forensic psychiatric patients have been rather slow.

4.89 In the Region of the Americas, advice was given to the Governments of Argentina, Brazil, Guatemala and Jamaica for the evaluation and reorganization of their mental health services and for training personnel. The reorganization of established psychiatric hospitals and the development of psychiatric services in the communities were also the subject of assistance provided to Argentina and Jamaica, while in Guatemala and Honduras advice was given in connexion with two new psychiatric hospitals opening there. In Brazil and Venezuela assistance was given in the organization of occupational therapy services in psychiatric hospitals. Brazil, Ecuador and Uruguay were assisted in the evaluation of their services for the mentally retarded and in the field of special education for such persons. A course on learning disabilities was conducted in Panama, with the cooperation of UNICEF and the Inter-American Children's Institute. A demonstration project on community techniques continued its operation in Chile, stressing work with schoolchildren and epileptic and alcoholic patients.

4.90 In the African Region attention has hitherto been focused largely on physical health problems but increasing attention is being drawn to mental health problems, and the theme selected for the technical discussions at the twenty-third session of the Regional Committee to be held in Lagos in 1973 is "The place of mental health in the development of public health services in Africa". Two examples of the way in which the Organization is promoting the dissemination of knowledge on mental health may be given from Ghana and from Nigeria. WHO assistance is given in the former for mental health teaching in the postbasic nursing school and in the latter for training in mental health at the University of Ibadan both for undergraduates and postgraduates and for auxiliaries.

4.91 The mental health programme of WHO lays much stress on education and training in order to ensure an adequate number of trained persons to

provide the services required. Examples are given elsewhere in this section and in Chapter 10. However, mention may be made here of a South-East Asia regional seminar on the teaching of psychiatry, held in Sri Lanka; the provision of assistance to national mental health seminars in Belgium and Spain; and the convening of a study group on the training of psychiatrists in the Region of the Americas.

4.92 The third of a series of five symposia on society, stress and disease, sponsored by WHO and the University of Uppsala, was held in Stockholm in May and June. The subject of this symposium was male and female roles and relationships in the productive and reproductive age. The topics discussed were primary and secondary prevention of stress-caused ailments in this context, the psychiatric and psychosomatic aspects, concepts of normality, and conditions under which psychosocial situations are likely to lead to disease (see also paragraph 9.26).

4.93 A consultation on mental health legislation was held in July to review current attitudes to fundamental aspects of mental health legislation, to discuss new concepts for improvement of existing laws, and to draw up preliminary guidelines which after further refinement might be helpful for countries in the adoption or revision of legislation on the care of the mentally disordered. Reference is made in paragraph 6.102 to a consultation dealing with the mental health problems of industrial workers.

4.94 In collaboration with the United Nations Social Defence Research Institute, the protocol was prepared for a study that is to be undertaken, using standardized methods, to compare the treatment of mentally abnormal offenders in different countries, and the Institute and WHO have set up a joint standing committee for planning and developing complementary programmes. The Institute also participated in a working group on problems of deviant social behaviour and delinquency in adolescents and young adults, organized in the WHO European Region, at which the Council of Europe, Interpol and the United Nations Division of Social Affairs were represented as well.

4.95 Standardization of psychiatric diagnosis, classification and statistics is important for advances in psychiatric knowledge and the provision of services. The WHO programme seeks to reduce the difficulties of communication among psychiatrists, administrators, public health personnel, statisticians, and the other agents involved in identifying, treating and rehabilitating the mentally ill. It is particularly concerned with difficulties involved in the reporting of information

about the frequency, diagnostic distribution, characteristics, and course of mental illness and about the facilities and resources for treatment. Essentially, the programme is designed to provide the basic elements for assessing the needs for mental health services and for planning and evaluation, as well as for epidemiological and other studies, thus leading to the development of new methods for assessing, preventing and controlling mental disorders.

4.96 At the eighth in the series of annual seminars on the standardization of psychiatric diagnosis, classification and statistics, held in Geneva in August, experts from 11 countries reviewed the programme's achievements over the past seven years and outlined priorities for the future. Three areas were particularly recommended for attention: (1) educational activities, including publication of glossaries, reports and teaching manuals; (2) research, which should include testing new models of classification, and further standardization of rating procedures and of diagnostic processes; and (3) standardization of statistical reporting. The seminar also recommended that a reference network of experts should be established to monitor the work in the programme, to coordinate national research and to collate information relevant both to the advances in psychiatric epidemiology and to development of work in the field of standardization of classification and psychiatric diagnosis.

4.97 The participants also agreed upon a proposed classification of psychiatric disorders for the ninth revision of the International Classification of Diseases, synthesizing the work and experience over the past seven years of experts from more than 35 countries. A proposed revision of the section of the International Classification of Diseases on neurological disorders was also drafted.

4.98 An essential characteristic of the programme for standardization of diagnoses is that it is based on empirical studies in the field, coordinated by WHO. One such study that has been under way for some time concerns a classification of childhood mental disorders under three headings, or "axes"—clinical psychiatric syndrome, intellectual level, and associated or etiological factors (coding being based upon the International Classification of Diseases). Testing of this tri-axial model was completed during the year in the United Kingdom, where it was found to be more reliable and easier to use than the International Classification of Diseases and to yield more information on the child patient. Tests are continuing in the Federal Republic of Germany, France and Switzerland. Further studies, using various other axes, are

now being initiated in relation to mental disorders of old age, definition of personality disorder, forensic psychiatry, and psychosocial factors affecting health.

4.99 The international glossary of psychiatric disorders referred to in the Annual Report for 1971¹ was finalized in the light of the test-use to which it had been put in that year. Analysis of the test has shown that this glossary is internationally acceptable and can play a useful role in teaching and in everyday psychiatric practice as well as facilitating the use of the International Classification of Diseases. Amendments necessary to allow the glossary's use with the proposed ninth revision of the Classification have been drafted and are being tested.

4.100 In a number of countries, notably Bulgaria and the USSR, national seminars were organized at which the diagnosis and classification of mental disorders were discussed, using the results of the diagnostic exercises that have been a feature of the annual WHO seminars referred to above. In the seminar held in the USSR a large number of psychiatrists from all parts of the Soviet Union met to discuss the problem of personality disorders; these are of particular importance in view of the current emphasis on outpatient services in psychiatry. In Bulgaria a series of cases was assessed by Bulgarian psychiatrists and the results compared with those previously obtained by WHO-coordinated international groups dealing with this problem.

4.101 In the programme concerned with collaborative research on specific mental disorders work on several studies has been continued. In the international pilot study of schizophrenia, which was started in 1966 in nine countries with the support of the United States National Institute of Mental Health and WHO, the last part of the two-year follow-up of the 1200 patients included in this study has been carried out and 80% of the patients have now been re-examined. Standardized procedures and schedules in the nine languages are being used for the assessment of these patients and are also being developed for further intensive international research on other types of mental disorders, particularly those seen by outpatient departments and basic health services. Training activities in this programme have entered a new phase and an integrated training programme in the nine field research centres is being developed. Other studies in the same programme include an assessment of the feasibility of long-term follow-up studies in developing countries, and a study of ethnic influences on psychopathology, including a study of migrants.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 3.84.

4.102 The Organization is initiating a multidisciplinary research programme on depressive disorders, which constitute one of the major mental health problems in the world today. As a preliminary step in this programme a collaborative study on the standardized assessment of depressive disorders has been started in Canada, Iran, Japan, and Switzerland. A consultation on the biological aspects of affective disorders took place in November, to review recent knowledge concerning the pathogenesis, treatment and prevention of this group of mental disorders, and to make recommendations for future collaborative studies.

4.103 WHO pilot studies to investigate methods of reporting suicide and to assess the reliability of the reports began in 1970 in Denmark and the United Kingdom and were extended in 1971 to 10 other countries. They have now shown that even within one country coroners or their equivalents may give different verdicts on the same case-history of reported suicide and that the divergencies may be sufficiently great to invalidate comparisons of published suicide rates within a country and *a fortiori* between countries. These rates are therefore hardly suitable as a basis for research on the prevention of suicide, and methods for improving their reliability and comparability are being sought.

4.104 The biological aspects of psychiatry have also been given increasing emphasis in the WHO mental health programme. The evaluation and dissemination of recent knowledge concerning the mechanisms of action of an increasing number of psychotropic drugs, as well as on their efficacy and safety in the treatment of mental disorders, have been one of the main tasks of WHO's international reference network in psychopharmacology, which was joined by three new collaborating centres during the year. Together with the national centres that work with the international reference centres, this network now includes a total of 22 participating centres, in all five continents.

4.105 A WHO-sponsored research training programme in biological psychiatry, with special emphasis on psychopharmacology, was initiated in 1972 in the Division of Psychopharmacology of McGill University, Montreal, Canada. The training programme is for one year and five Latin American fellows were selected for initial participation. Similar courses will be organized in the future in various centres within the network.

4.106 WHO has also participated in the study of nutritional and other environmental factors affecting brain maturation and mental development, in close

collaboration with the International Brain Research Organization. In the United Republic of Tanzania WHO continued its support for a research project on the effect of malnutrition on mental development which is being carried out at the Department of Psychiatry of the University of Dar es Salaam. A set of simple non-verbal reasoning tests, which has been developed there, was tried out in a group of primary-school children in Dar es Salaam and is now being tested in more isolated non-urban areas. These tests are designed to evaluate the psychobiological development of well nourished and badly nourished children.

Drug dependence and alcoholism

4.107 In May 1972 the Twenty-fifth World Health Assembly, in its resolution WHA25.62, recognized that the abuse of dependence-producing drugs continues to be a worldwide problem involving serious adverse effects on health; stressed the need for the coordinated efforts of international, regional, national and local organizations and authorities and of individuals in seeking solutions to the problem; and indicated that WHO has an obligation to provide medical leadership, guidance and technical assistance in the field of drug dependence. Under the expanded programme approved by the Twenty-fourth World Health Assembly¹ several projects were prepared, and ways and means of obtaining financial support for their implementation were explored.

4.108 The United Nations Fund for Drug Abuse Control (UNFDAC) provided assistance to initiate the following WHO projects: a comparison of maintenance methods for the management of narcotic-dependent persons in Iran, the United Kingdom and the USA; studies on the effects of the chronic use of cannabis; and the preparation of a brochure on drug dependence for use by the medical and related professions. UNFDAC also approved in principle, subject to the availability of funds, a project to initiate a research and reporting programme on the epidemiology of drug dependence—part of the expanded programme approved by the Twenty-fourth World Health Assembly. In addition, the Organization and the United Nations are collaborating in the development of a comprehensive programme to control drug dependence in Thailand, also funded by UNFDAC. In connexion with the last-named project, a United Nations/ILO/WHO planning mission visited Thailand during 1972 to draw up a draft plan on the treatment and rehabilitation aspects of the programme.

¹ See *Off. Rec. Wld Hlth Org.*, 1971, No. 193, resolution WHA24.57 and Annex 10.

4.109 The Organization maintained close collaboration with other bodies working in the field of drug dependence, including, in particular, the United Nations Division of Narcotic Drugs, the International Narcotics Control Board, and the United Nations Commission on Narcotic Drugs.

4.110 WHO continued to support research on the development of a methodology to ascertain the effects on man of certain drugs and to determine their degree of psychic and physical liability. It also assisted an exploratory field study on khat-chewing in the Eastern Mediterranean and published a review of the literature on the medical aspects of the chewing of khat leaves.¹

4.111 In November, the WHO Expert Committee on Drug Dependence gave particular attention to the ways in which the epidemiological approach could most usefully be applied to the study of drug dependence. The very nature of the problem raises a number of special epidemiological difficulties—some of them unique, or applying with particular force, to this field. The committee noted, for instance, the diversity of drugs, users and sociocultural environments involved; the number and variety of disciplines necessary for broad-based analytical epidemiological studies; the fact that social disapproval results in the concealment or denial of drug-taking, rendering case-finding particularly problematic; the importance of economic profit at many levels; and the fact that, unlike most persons with health disorders, those who are drug dependent actively seek out the agent associated with their disorder. The committee considered what means could best be used to define the true nature and magnitude of the problem, to identify the complex etiological factors, and to evaluate the results of intervention programmes against drug dependence, noting a number of areas where increased research was urgently needed. It also recommended measures to increase both the number and the comparability of studies in order to lay a solid foundation of scientific knowledge on which appropriate action can be based.

4.112 While the types of drug dependence and patterns of abuse vary widely from country to country, the increasing frequency of transfer from one dependence-producing drug to another, and of abuse of drugs in combination, makes it important that dependence on alcohol and other drugs be considered as facets of one problem. This concept was reflected in WHO's work during 1972. In September, for example, the second interregional seminar for national programmes on problems of alcohol and drug de-

pendence was held in Sweden, Yugoslavia and Switzerland. A review of the situation in the three host countries—which had been chosen to illustrate the variety of programmes available to deal with the problem—was circulated in advance to the participants, all of whom prepared similar reviews of the situation in their own countries, as a basis for discussion. The participants—from 22 countries in all six WHO Regions—spent one week in each of the host countries, where they were able to observe and discuss the programmes in operation; they also considered ways and means of improving coordination at the national level between the various drug dependence programmes being carried out by both voluntary and official agencies.

4.113 In the European Region a systematic long-term programme has been developed in the field of drug dependence and alcoholism—covering prevention, treatment and rehabilitation, epidemiology, and research. The scope and content of the programme were reviewed by a steering committee which meets annually for this purpose. In general, the committee endorsed the proposed programme, but it felt that more attention should be given to alcoholism and to preventive measures, especially health education. It also emphasized the importance of close collaboration between WHO and other organizations working in this field, to avoid duplication of effort. Proposals have been submitted to UNFDAC for the financing of regional projects on drug dependence registers, the early detection of drug dependence and abuse, and the organization and planning of services in this field.

4.114 The epidemiology of drug dependence was the subject of a conference organized in London during September with the support of contributions by the Federal Republic of Germany and the United Kingdom to the Voluntary Fund for Health Promotion. Research workers, psychiatrists, psychologists, sociologists and health administrators from 10 countries in the European Region, as well as from Canada and the United States of America, considered the possibilities of establishing standardized methodology and criteria for epidemiological research as a basis for practical treatment and preventive measures. Consideration was given to means of developing a more accurate and scientific basis for the collection and analysis of statistical data on the different national patterns of drug dependence, within the programme approved by the Twenty-fourth World Health Assembly. A number of the presentations made at this conference were among the material considered by the expert committee mentioned above.

¹ Halbach, H. (1972) *Bull. Wld Hlth Org.*, 47, 21-29.

4.115 At a multidisciplinary symposium on drug dependence organized by the Council of Europe in Strasbourg in March, WHO presented one of the four basic reports on which the discussions centred. The participants included some 200 parliamentarians, politicians and experts in the health, social, educational, law enforcement and legal aspects of the problem. It was recommended that a network of information and research centres be established to coordinate the work of detection, prevention, treatment and rehabilitation in the field of drug dependence; that governments consider the inclusion of education on dependence-producing drugs in school curricula; that treatment centres be provided for inpatients and outpatients; and that penal laws concerning drug-dependence be harmonized.

4.116 The problem of drug dependence—including alcoholism—among young people is a matter of great concern in an increasing number of countries. Health education programmes in this field were discussed by a working group that met in Hamburg in April, with support provided by the Government of the Federal Republic of Germany through the Voluntary Fund for Health Promotion. The participants, representing nine Member States in the European Region, presented reports summarizing the situation in their own countries. The discussions, covering both the content and the presentation of health education programmes, were focused on the theoretical and practical aspects of using national and local health education campaigns to secure a change in attitude regarding drugs. Stress was laid on the need for a clear definition of realistic goals and for evaluation of the outcome of these campaigns.

4.117 During 1972 governments in most of the WHO Regions showed an increased interest in the control of drug dependence. In the Region of the Americas the Organization assisted governments by disseminating information on the problems of drug dependence and alcoholism and by providing assistance for the training of personnel specialized in this field; an example was the advice given to Trinidad and Tobago on the evaluation of health problems of youth, with special emphasis on drug dependence. With the assistance of a grant from the National Institute on Alcohol Abuse and Alcoholism, USA, preparatory work was undertaken for the initiation of international epidemiological studies on alcoholism and the establishment of a regional centre for such studies.

4.118 In the South-East Asia Region a two-day seminar on the control of drug dependence was held in India, WHO contributing a paper describing the

experience of other countries in this field. The Organization also provided assistance to India with regard to the development of programmes for the control of drug dependence, and to Burma for training in drug abuse control.

Dental health

4.119 The main spheres of activity in WHO's dental health programme during 1972 were concerned with research on epidemiological aspects of oral diseases and comparative studies in dental epidemiology, and assistance to countries in the organization of dental health services, the promotion of preventive measures and the development of educational programmes for dental personnel (see Chapter 10).

4.120 Further progress was made in the study on the etiology of dental caries in Papua New Guinea, which is being supported by the United States National Institutes of Health. Most of the field work was completed, including oral examinations and the collection of samples of saliva, plaque and tooth enamel, as well as samples of soil and food for analysis of certain trace elements that may be associated with differences in the prevalence of dental caries in various regions of the Sepik district. Data collected during previous field studies were summarized and analysed.

4.121 The scope of WHO-assisted research was extended to cover new fields. Epidemiological studies on certain oral mucosal conditions were initiated in Indonesia and Thailand, and in a programme of research on dental caries being carried out with the collaboration of the New Zealand Medical Research Council samples of extracted teeth from a number of different countries are being analysed for trace elements.

4.122 Research aimed at improving the quality and standardization of materials used in dentistry was carried out in Venezuela with assistance from both the Organization and the Kellogg Foundation. Studies on the clinical effectiveness of materials specifically used in dentistry were started in Colombia, Mexico and Peru, and a national programme for the quality control of dental materials was initiated in Ecuador.

4.123 Standardization in the collection and reporting of data on less common oral mucosal diseases, tumours and pathological conditions of the oral and maxillo-facial region should be considerably facilitated by a manual prepared during the year on the applica-

tion of the eighth revision of the International Classification of Diseases to dentistry and stomatology. This is a revised version of the manual published in 1969, amended on the basis of experience since gained in the field. Further amendments will be made in relation to the ninth and subsequent revisions of the Classification.

4.124 More than 15 countries used the survey forms outlined in the manual¹ issued during 1971 to collect internationally comparable data on the more frequent oral diseases, and WHO assisted in summarizing and analysing the data obtained.

4.125 WHO-supported studies were continued by the Central Research Institute of Stomatology, Moscow, where a survey is being made of the distribution of dental caries, periodontal diseases and loss of teeth among children and adults as related to different ethnic groups, nutritional patterns, fluoride content of drinking-water, and geographical conditions in various parts of the Soviet Union.

4.126 A study was initiated in Uganda to determine the magnitude of differences in the prevalence of dental caries in selected regions of the country; samples of dental plaque and tooth enamel are being analysed to ascertain the reasons for these variations.

4.127 As part of WHO-supported international dental epidemiological studies in Latin America, the School of Public Health of the University of Antioquia, in Colombia, carried out research to assess periodontal disease in various age groups and the reduction of oral diseases through preventive measures. Training in dental epidemiology and research methods formed an important element in this programme. A study on the microbiological origin of dental caries was also started by the University of Antioquia, the survey covering children in two communities, one with a high and the other with a low prevalence of dental caries.

4.128 Details were finalized during the year for the implementation of an international study to evaluate the effectiveness of various organizational and manpower patterns for the delivery of dental care. Australia, Bulgaria, the Federal Republic of Germany, Japan, New Zealand and Norway have agreed to participate in this study, which is being carried out with the cooperation of WHO and the Division of Dental Health of the Public Health Service in the USA and is to include the collection of epidemiological and sociological data on selected population

groups, as well as information on the administrative patterns of the various systems.

4.129 Assistance in the organization and planning of dental health services was provided to Burma, Ecuador, Guyana, the Khmer Republic, the Philippines, the Republic of Viet-Nam, Togo and Venezuela. In the Seychelles a survey carried out among schoolchildren revealed an exceedingly high level of oral diseases, and WHO provided assistance in setting up low-cost community dental health programmes.

4.130 Following an earlier survey on child dental health in a number of countries in the European Region, a study was made during 1972 of the organization and effectiveness of dental health services for children in Austria, Czechoslovakia, the Federal Republic of Germany, Norway, Romania, Spain, Switzerland and the United Kingdom. The data collected were analysed and a report was prepared describing the design and organization of the different systems in those eight countries, and discussing the possibilities of developing international comparative studies on dental health in Europe.

4.131 At a regional workshop on dental health services held in Singapore in May 1972, participants from countries in the Western Pacific Region reviewed data collected during WHO-assisted national dental epidemiological surveys carried out as part of a 10-year regional programme. The workshop was similar in scope to the seminar jointly sponsored by WHO and the South Pacific Commission for countries and territories of the South Pacific in 1971. Guidelines for regional and national dental health services and requirements for the education and training of dental personnel were discussed, and emphasis was laid on the need to develop school dental services, dental health education, and the training of dental auxiliaries.

4.132 To help promote the prevention of dental caries the Organization provided assistance for the development of water fluoridation programmes in a number of countries. In the Region of the Americas, Costa Rica, Ecuador and Mexico were among the countries receiving such assistance, and in Argentina the Organization helped to establish a model defluoridation plant. In addition, manuals were prepared to provide countries in the Region with guidance on the production of simplified dental and fluoridation equipment, and courses on water fluoridation were held in Brazil and Venezuela. The results of surveys carried out in most countries of the African Region indicated either a lack or an excess of fluorides in water supplies in many areas. The United Republic of Tanzania received assistance in carrying out dental

¹ World Health Organization (1971) *Oral health surveys: basic methods*, Geneva.

health surveys in such areas and in designing low-cost engineering appliances to fluoridate or defluoridate the water supply as appropriate.

4.133 In the European Region a cost/benefit analysis was made of the various uses of fluoride for caries prevention in Czechoslovakia, the Netherlands, Sweden, Switzerland and the United Kingdom, the cost of the preventive measures (in terms of funds and manpower) being set against the estimated saving in curative work resulting from their use.

4.134 In the Western Pacific Region a recently issued manual¹ was widely used, both by health personnel and others in a position to influence community and individual dental health practices, for the selection of appropriate dental health education and preventive measures according to a community's social and cultural patterns and the prevailing oral disorders.

4.135 Close cooperation was maintained with the International Dental Federation. WHO participated in the Federation's XV World Dental Congress held in Mexico City in October, when special attention was given to preventive measures in dental health; WHO contributed, in particular, to discussions on the utilization of dental auxiliary personnel, public dental health services, and preventive aspects of dental health programmes for children. The Organization also participated in the Federation's European seminar for dental health, held in Göteborg, Sweden, and presented papers on various aspects of dental epidemiology and on operating dental auxiliaries.

Human genetics

4.136 The WHO programme in human genetics is largely concerned with the haemoglobinopathies—the most frequent and widespread genetic disorders—and the public health problems they raise. The main features of the programme are: surveys to assess the frequency of the haemoglobinopathies in individual countries; studies of the biology of these disorders; investigations of their treatment and prevention; and research on the association between genetic markers and disease.

4.137 During 1972, surveys of abnormal haemoglobins and β -thalassaemia were extended to include Northern Nigeria, Romania, Saudi Arabia and Senegal. The main purpose of the project in Senegal is to measure the frequency of abnormal haemoglobins. Existing data indicate the presence of both S

and C haemoglobins; the survey should make it possible to estimate gene frequencies in several ethnic groups and, using genetic models, to ascertain inter-relationships between populations in considerable detail. Data collected in the course of WHO-assisted treponematoses surveys in Senegal (see paragraph 1.84) should permit the estimation of the "genetic distances" between the populations of villages inhabited by members of the same ethnic group and between different ethnic groups.

4.138 It has long been known that persons heterozygous for haemoglobin S are generally less severely affected by falciparum malaria, but many possible associations between haemoglobin abnormalities and other diseases have still to be confirmed. A secondary aim of the Senegal study, then, will be to investigate possible relationships between phenotypes having an abnormal haemoglobin and certain serological measurements obtained in the treponematoses surveys, in particular those relating to yaws. Since the total sample is large, it is possible that even weak associations will be identified. The study of associations will also include the Gm and Inv serum markers and the markers of the Pi system, which are carried on the α -1-antitrypsin protein of serum. The most extreme genotype of the system lacks this protein and may be responsible for chronic respiratory ailments resulting in lethal or sublethal pulmonary emphysema under respiratory stress.

4.139 A similar study is being carried out within the framework of the WHO research project on the epidemiology and control of malaria in the African savanna (see paragraph 2.30), in which the University of Ibadan and the Ahmadu Bello University, Zaria, Nigeria, are collaborating. The association between haemoglobin phenotypes and immunological parameters will be tested in a sub-Saharan population in the Garki area of Northern Nigeria, and it is planned to collect data on which family studies can be based. Preliminary findings indicate a high frequency of heterozygotes for haemoglobin S in the population.

4.140 A WHO-assisted survey of the incidence of β -thalassaemia and G6PD deficiency has been initiated in Romania. One of the aims is to complete the distribution charts of G6PD deficiency in the country. The project will also include studies of biochemical variants of that enzyme, clinical investigations of thalassaemia, and determination of the frequency of other abnormal haemoglobins.

4.141 Among the Shiite Arabs in Saudi Arabia, high frequencies of haemoglobin S have been found and,

¹ Available on request from the WHO Regional Office for the Western Pacific, Manila.

although SS homozygotes are not uncommon, they are almost asymptomatic. Patients have a high level of fetal haemoglobin, whereas in normal subjects the synthesis of this haemoglobin is usually repressed after birth. In collaboration with the Nuffield Unit of Medical Genetics, University of Liverpool, United Kingdom, WHO has supported studies in this population on the mechanisms permitting continuing synthesis of fetal haemoglobin.

4.142 The course of sickle-cell anaemia and β -thalassaemia, like that of all haemolytic anaemias, is interspersed with haemolytic crises. In the case of G6PD deficiency, which cannot be considered a disease in itself, the haemolytic crises develop only under a well defined stimulus. In a WHO-supported study at the Hadassah Medical School, Jerusalem, the possibility of preventing such crises in β -thalassaemia has been investigated. It was found that the inclusion bodies almost always occur in the central part of the red cell, but their role in the haemolytic mechanism has still to be clarified. The investigation is now concentrating on the properties of the cell membrane in thalassaemia.

4.143 WHO-assisted studies of the effectiveness of xylitol, a pentose sugar, in preventing drug-induced haemolysis in G6PD deficiency were continued at Vanderbilt University, Nashville, Tenn., USA. Satisfactory results were obtained in animal tests, but further toxicity studies appear to be indicated.

4.144 Research on the problems raised by G6PD deficiency is complicated by a number of factors; haemolysis is induced *inter alia* by drugs and by infections, but there are wide individual variations in reactions to these stresses. WHO is supporting a study at the Division of Haematology, Siriraj Hospital, Bangkok, of possible correlations between different variants of G6PD and specific types of reaction.

4.145 A practical consequence of frequency studies of haemoglobins in health surveys is that they permit the associations between these markers and disease to be investigated. The WHO programme has now been extended to include investigations of associations between other genetic markers and pathological states. A WHO-assisted study of the leucocyte antigens and their distribution in specific diseases, with special reference to Burkitt's lymphoma, has started at the Genetics Laboratory, University of Oxford, United Kingdom. A significant association between blood group A and thromboembolic disease was recently reported in the United Kingdom, notably in women taking oral contraceptives, pregnant and puerperal women, and coronary thrombosis patients. This

phenomenon has been related to a higher level of factor VIII in persons with blood group A, but further investigations are necessary. WHO is now collaborating with the Serological Population Genetics Laboratory, Medical Research Council, London, in a study of this problem.

4.146 The Organization continues to support population studies of chromosome disorders in an effort to evaluate the rates of spontaneous aberrations in man. The development of new methods to identify individual chromosomes of the human karyotype has greatly facilitated this work. With these methods, even small structural aberrations become identifiable and they can be correlated with clinical findings.

4.147 Studies on the inactivation of whole chromosomes in insects and mammals are being carried out, with WHO support, at the Institute for Genetic Studies, Bangalore, India. The increasing interest in the mechanisms controlling gene activity in multicellular organisms stems in part from the theory that one of the two X chromosomes in cells of mammalian females is genetically inactive. Chromosomal inactivation occurs in both insects and mammals, suggesting that hetero-chromatization is a fundamental capacity of chromosomes.

4.148 The relationship between leukaemias and chromosomal aberrations was examined in a WHO-assisted study at the Department of Genetics, National Institute of Nutrition, Mexico City. Two groups of patients with potential leukaemic myeloid disorders were involved, those in the second group presenting chromosomal abnormalities as well. The number of patients in each group was limited because of the comparative rarity of the conditions under study. Leukaemic transformation took place in the patients in the first group, normal karyotype being maintained; in the second group, only one patient developed leukaemia. This suggests that the presence of abnormalities in bone marrow chromosomes does not necessarily mean that leukaemic transformation is imminent.

4.149 During 1972, the Organization assisted genetic surveys of selected populations in Africa and South America. The genetic structure of the Bedik and Niolkongo peoples of the western Sahara was studied by the National Institute of Demographic Studies, Paris. In Nigeria, the University of Ibadan is investigating the effects of inbreeding in an Oka group, belonging to a Yoruba-speaking culture, on such variables as number of pregnancies per woman, live and still births, number of living children, and the health status of the children. A small isolated population living on an island off the coast of northern

Brazil is being investigated by the Federal University of Paraná, Curitiba, Brazil. This study is of unusual interest in that about 4% of the population are affected by a form of albinism. The island is near the equator and thus exposed to intense solar radiation, about 60-70% of its area is covered by arid dunes, and the people work mainly out of doors. In these conditions, albinism has rather severe consequences. The investigation includes estimations of such factors as the inbreeding coefficient, the breeding population, the effective population size and chance genetic variations.

4.150 The Organization has been studying the possibility of using computer programmes as an aid to the provision of genetic counselling, and the outline of one such programme has been prepared.

4.151 A WHO scientific group met in Geneva in December to review the present knowledge on pharmacogenetics and consider the most effective ways of preventing the harmful effects of drugs on susceptible phenotypes. Technical recommendations were made with the aim of encouraging coordinated research on the subject. In particular, the group recommended improvements in the methodology of pharmacogenetics through the application of more refined genetic analysis and further development of chemical methods and kinetic techniques for the recognition of phenotypes. It also recommended that population studies be carried out to elucidate the variations between different ethnic groups in their metabolism of, and response to, drugs and to identify populations at high risk owing to their possessing alleles predisposing them to susceptibility.

5. IMMUNOLOGY

5.1 Progress in immunological research continued at a rapid rate in 1972, producing new concepts and new techniques with important potential applications to public health problems. The thymus, an organ whose function was unknown until recently, has now been clearly shown to be the source of lymphoid cells which are essential not only for the mechanisms of cellular immunity, but also for the production (by bone-marrow-derived cells: B-cells) of circulating antibodies against many antigens. Many of the cellular events through which thymus-derived lymphocytes act to increase resistance to bacterial, viral and protozoal diseases are mediated by factors released by the thymus-derived cells (T-cells). One of the Organization's tasks is to apply—or stimulate the application of—new knowledge on circulating antibodies and cellular immunity in research projects to develop more effective immunodiagnostic tests, more effective immunizing procedures, and a better understanding of the immunopathological lesions accompanying many infectious diseases. It also has another, no less important, task in this field. Protozoal diseases, such as malaria, trypanosomiasis and leishmaniasis, viral diseases such as dengue haemorrhagic fever, and many bacterial diseases such as leprosy, tuberculosis and enteric infections are the very diseases which appear to offer the most promising potential for the application of new knowledge in immunology research; but they are prevalent in developing countries where immunologists are scarce and immunological research is in its infancy. In 1972, therefore, the WHO immunology programme continued to concentrate on the dissemination of knowledge on cellular immunology and the establishment and further development of research projects in that field, and on the continuation of research projects on circulating antibodies—in particular in the activities of its international network of immunology research and training centres, which has made a significant contribution towards increasing the number of research immunologists in developing countries.

Research and training centres for immunology and other training activities

5.2 After seven years, the Organization's direct participation in the development and operation of the WHO Immunology Research and Training Centre

at the University of Ibadan, Nigeria, has ended, and it has been possible to withdraw the WHO staff and turn over the research and training functions to university personnel. The Centre was established in the Department of Chemical Pathology in 1965 with the initial purpose of assisting scientists from the African Region to learn essential immunological concepts and techniques and to help to introduce immunology into the biomedical curriculum. The Centre has conducted annual immunology courses and collaborated in the establishment of immunological research into public health problems of importance to the African Region. A total of 32 students from six African countries have graduated from the Centre (seven students from four countries in 1972), and a number of Ph.D. degrees based on immunological work have been awarded by the University. Immunology was introduced into the medical curriculum in 1969. The Nigerian professor who is now head of the Centre is a graduate of the first course held there.

5.3 An evaluation of the Centre's work has shown that its teaching and training are well integrated into the University's activities; and its research projects are focused on diseases of regional significance. Some of the basic and applied research programmes now under way deal with malaria, trypanosomiasis, hepatitis, isolation and characterization of antigens, humoral and cellular immunity, immunoglobulins and immune complexes, and immunological aspects of veterinary medicine.

5.4 The Department of Chemical Pathology at Ibadan continues to function as an immunology research and training centre. The withdrawal of WHO staff and the cessation of the Organization's direct involvement have made it possible for WHO to deploy its immunological resources elsewhere in Africa, and late in the year a new centre was established at the Faculty of Medicine of the University of Nairobi.

5.5 The fourth annual training course was held at the WHO Immunology Research and Training Centre in Singapore, for students from eight countries in the South-East Asia and Western Pacific Regions. Altogether 50 students have attended the four courses.

Research activities conducted in collaboration with the International Agency for Research on Cancer (see paragraphs 4.66 and 4.74) include epidemiological and immunogenetic studies of two viral agents—Epstein-Barr virus (EBV) and Australia or hepatitis B (HB) antigen—in relation to nasopharyngeal and hepatocellular carcinoma. A community study of apparently healthy Chinese, Malay and Indian families is under way. The age dependency of exposure to EBV and HB has been determined. A radioisotopic technique involving electrophoresis has been developed for quantitation of HB antigen and antibody. An interesting finding is the presence of low levels of specific immune complexes in HB antigenaemic subjects. To investigate the apparent genetic predisposition of the Chinese in Singapore to develop nasopharyngeal cancer, histocompatibility (HL-A) antigen typing of nasopharyngeal cancer patients is in progress. Other research projects include study of IgE levels in South-East Asian populations in relation to parasitism, and research on immunological aspects of infertility.

5.6 The WHO Immunology Research and Training Centre in Beirut completed its second annual course in basic and applied immunology, for students from five countries in the Eastern Mediterranean Region. The two courses have provided opportunity for contacts and exchange of scientific ideas among the participants, and have led to regional or interregional collaboration in a number of research studies. For instance, methods developed for investigation of malaria-associated nephritis (see paragraph 5.19) are being applied in Beirut and, with WHO support, in Asyut, Egypt, to try to elucidate the pathophysiology of the nephritis associated with schistosomiasis, and the investigators will collaborate on investigations of immunopathological mechanisms in renal lesions occurring with other parasitic diseases. The Centre in Beirut is also participating in the study of the effects of malnutrition on the immune response referred to in paragraph 5.18. Attention is being focused in the Eastern Mediterranean Region on a lymphoma of the gastrointestinal tract which is frequently associated with alterations in serum immunoglobulins. It is of particular interest that remissions occur in some cases following treatment with antibiotics, suggesting the hypothesis that the lymphoma may arise as a result of prolonged antigenic stimulation by enteric organisms. Discussions are under way with epidemiologists, pathologists, and immunologists with a view to the organization of a collaborative investigation of this disease.

5.7 The PAHO/WHO Immunology Research and Training Centre in São Paulo, Brazil, conducted

investigations into the mechanism of production of homocytotropic antibodies in the guinea-pig, the effect of splenectomy and thymectomy on antibody production, the effect of *Bacillus pertussis* vaccine on cell-mediated immunity, factors present in *B. pertussis* cells responsible for their adjuvant effect, and the complement-inactivating substances present in the venom of the snake *Bothrops jararaca*. As it does annually, the Centre also held a four-month course in advanced immunology for students from the Region of the Americas. Students who show talent for research are offered the opportunity to continue at the Centre for one or two years to carry out a specific research project.

5.8 In Mexico City, the PAHO/WHO Immunology Research and Training Centre, which is also sponsored by the Mexican Government, now draws its staff from 10 cooperating institutions in the Mexican capital, and also has visiting professors from abroad. It offers graduate work leading to master's and Ph.D. degrees, as well as short courses on specific problems in immunology. Some of this Centre's research in 1972 was on the metabolism of Enterobacteriaceae antigens, especially the common Kunin antigen of *Escherichia coli* and the O antigen of *Salmonella typhi*, in relation to diarrhoea of the newborn and typhoid fever in children; the mechanism of immunological tolerance of aggregated proteins; the immunochemistry of polysaccharides from *Mycobacterium leprae* and *Klebsiella rhinoscleromatis*; and the mechanism of allografts and xenografts of kidneys in rabbits.

5.9 A meeting of investigators on immunological problems in leprosy research took place in New Delhi in December in close collaboration with the immunology research and training centre that is being developed there in collaboration with the Indian Council of Medical Research. The meeting reviewed data suggesting a failure of cell-mediated immunity in leprosy and discussed means to organize a trial to determine the usefulness of transfer factor in increasing cellular immunity in lepromatous leprosy. Suggestions were made as to promising areas of research into the immunology of leprosy, and possible collaborative research projects were discussed. This meeting was preceded by a three-day national symposium on the immunology of leprosy organized by the Indian Council of Medical Research. This centre is also conducting research into cell-mediated immunity in malnutrition, and in November it organized a two-week course on modern *in vitro* techniques which can be used in research on cell-mediated immunity.

5.10 Also in the South-East Asia Region, a second regional workshop in immunology was held in

Bangkok in August-September. It was attended by participants from India, Indonesia, Nepal, Sri Lanka and Thailand, who discussed in particular the immunological aspects of communicable diseases—leprosy, cholera, tuberculosis, malaria, other parasitic diseases, and poliomyelitis.

5.11 Research at the WHO Immunology Research and Training Centre in Lausanne, Switzerland, seeks *inter alia* to discover the mechanism of immune protection to an intracellular parasite present in macrophages: *Leishmania* infections of guinea-pigs produce a local skin lesion which heals after 2-3 months and infected animals subsequently show solid immunity to reinfection. In many ways this disorder is similar to the tropical type of leishmaniasis in man. Previous work had established that a cell-mediated response occurs and suggested that sensitized lymphocytes rather than antibodies might be responsible for protection. Work at the Centre has shown that sensitized lymphocytes are indeed present in immune animals but that antibodies can also be demonstrated. It was found that lymphocytes, when exposed to *Leishmania* antigen, were capable of causing macrophage activation, as has already been recognized in numerous other systems. However, these activated macrophages, although capable of destroying an unrelated organism, *Listeria monocytogenes*, appeared incapable of destroying intracellular *Leishmania*. This interesting difference suggests that not all phagocytosed organisms may be susceptible to destruction by the lymphocyte-activated mechanism. Further work will be directed to learning whether sensitized lymphocytes are essential for protection and will investigate the possibility that a combination of cell-mediated and humoral mechanisms may be required.

5.12 A training course for students from 11 countries was conducted, based on the work in progress in the Centre and in other laboratories in Lausanne. This course reviewed the latest progress in cell-mediated immunity, and practical laboratory exercises were carried out by the students to learn about recent advances. Leading experts in this field of immunology took part in the teaching programme.

5.13 This Centre also functions as the WHO International Reference Centre for Immunoglobulins. In conjunction with the Standardization Committee of the International Union of Immunological Societies, it began work on the assessment of chicken antisera to human immunoglobulins as reagents to detect homologous proteins in a variety of different species. Together with the Ibadan Centre, it continued a joint project on measurement of serum IgE concentrations in patients in Ibadan subject to various parasitic

diseases and to allergy. Preliminary findings show that some parasitic diseases are associated with high levels of IgE and that superimposed conditions have relatively little effect in increasing serum levels. This work in both Centres receives financial support from IAEA.

5.14 The WHO Immunology Research and Training Centre for Advanced Studies, in Rehovot, Israel, organized a course jointly sponsored by UNESCO and WHO on the molecular aspects of antigenicity and immunoglobulins in October, which was attended by participants from 15 countries in several WHO Regions; and the similar Centre in Basle, Switzerland, provided training in immunology on an individual basis.

5.15 In Copenhagen, the Organization held a three-week course for teachers of immunology in medical schools. This was financed by DANIDA and attended by participants from 14 countries in all Regions. The latest concepts of modern immunology were reviewed, with special emphasis on the best ways of teaching it; among the subjects discussed was the way in which immunology was taught in each participant's country.

Applied immunology research and public health

5.16 A WHO Scientific Group on Cell-mediated Immunity and Resistance to Infection that met in September reviewed recent research developments in cellular immunology and particularly how these developments relate to host resistance in infectious diseases. They considered the role of antibody, complement, phagocytic cells, and lymphocytes and lymphocyte products and discussed present concepts of how various humoral and cellular factors work together *in vivo* to protect human populations from infectious diseases. The group made recommendations for research into bacterial, viral and parasitic infections, and into the development of diagnostic and therapeutic measures based on new knowledge of mechanisms of cell-mediated immunity.

5.17 Phagocytic mononuclear cells play an important role in the body's defence mechanism, and many scientists are investigating the process by which they cooperate with the lymphoid cells active in cell-mediated immunity. It is therefore important to have agreement on the classification of these phagocytes and a clear definition of the system they form. It was felt that none of the several classifications previously proposed was entirely satisfactory in the light of present knowledge, and a new classification of all highly phagocytic mononuclear cells and their precursors has now been proposed in what is termed the

"mononuclear phagocyte system".¹ This proposal is the outcome of consultation, actively promoted by WHO, among more than 80 leading investigators throughout the world over a period of four years.

5.18 An international collaborative study of inter-relationships between nutritional states and immunological function was begun in some centres following an informal consultation held by WHO in 1971,² and was extended to a large number of laboratories in 1972. Five core laboratories are now investigating humoral and cellular aspects of immunity in malnourished as compared with well nourished children in five countries, and a group of 15 collaborating laboratories is carrying out specialized *in vitro* studies of immunity in malnourished children in 10 countries. The core laboratories, which all use the same reagents, are responsible for nutritional evaluation, immunoglobulin measurements, and laboratory tests of immune response to diphtheria-pertussis-tetanus vaccine, and tuberculin skin testing following BCG vaccination. The collaborating laboratories are studying many humoral and cellular aspects, including tests for T-cell and B-cell functions, leucocyte enzymes, and phagocytosis. The results so far indicate that B-cell function is generally normal in malnutrition but that T-cell function and phagocytosis are depressed. These defects may be in part responsible for the greater frequency of infections in malnourished children. The WHO International Reference Centre for Tumour-Specific Antigens, in Moscow, is also collaborating in this study, using sera received from the IARC research centre in Nairobi to investigate whether malnutrition leads to a resynthesis of fetal antigens.

5.19. Immunological methods successfully used at the WHO Immunology Research and Training Centre in Ibadan to establish that antigen-antibody complexes containing *Plasmodium malariae* antigens are involved in the pathogenesis of malaria-associated renal lesions³ are being introduced at the newly established Centre in Nairobi in order to extend the study to East African conditions. Meanwhile, the Ibadan Centre, in collaboration with the University of Geneva, began studies on the turnover of antigens and antibodies in the immune complexes localized in the glomerular lesions in malaria-associated nephritis.

5.20. The WHO International Reference Centre for Testing of Natural Resistance Factors, in Prague, helped to organize and participated in an international

symposium on non-specific factors of resistance held in Berne. Much of the work of this Centre on the characterization of natural antibody and on the ontogeny of natural resistance factors was discussed at this symposium.

5.21 Worldwide application of anti-Rh immunoglobulin immunization, as detailed in the report of the WHO Scientific Group on the Prevention of Rh Sensitization that met in 1970,⁴ may be expected in time to go a long way to solving this public health problem. Present knowledge of intrauterine isoimmunization indicates that it is primarily due to the induction of antibody formation by B-cells, but the mechanism by which passively administered antibody suppresses the immune response and thus prevents Rh isoimmunization is not known and further research on regulation of the immune response at a cellular level is needed. The WHO International Reference Centre for the Use of Immunoglobulin Anti-D in the Prevention of Rh Sensitization, London, is carrying out an international collaborative study to clarify problems of quantitation in assay methods for antibodies to red-cell antigens.

5.22 At a consultation on the immunopathology of virus infections⁵ a review was made of the animal models in which it has been clearly demonstrated that the tissue damage caused by virus infection is due not only to virus multiplication in body cells, but frequently also to the host's immune response to viral antigens and to disturbance of the immune system by some viruses, particularly in *persistent* virus infections. Attention was focused on the need for studies of a possible viral etiology in chronic human diseases of unknown origin where immunopathological mechanisms are suspected, but where the antigen involved is unknown and might be a persistent virus. *Acute* viral infections may also have immunopathological sequelae. The studies of the shock syndrome in dengue haemorrhagic fever, which began in 1971 in Bangkok and are coordinated by WHO, were continued during 1972. They have clearly established that activation of both the classical and alternate pathways of serum complement occur in dengue haemorrhagic shock and that the degree of changes in serum complement levels correlates well with the degree of shock. In 1972 the studies included measurements of the level of serum inhibitors of the anaphylotoxins which are produced by complement activation. If a deficiency of inhibitors can be demonstrated, studies in 1973 may include preventive or therapeutic trials of treatment in impend-

¹ Furth, R. van et al. (1972) *Bull. Wld Hlth Org.*, 46, 845-852.

² *Bull. Wld Hlth Org.*, 1972, 46, 537-546.

³ *Bull. Wld Hlth Org.*, 1972, 46, 387-396.

⁴ *Wld Hlth Org. techn. Rep. Ser.*, 1971, No. 468.

⁵ *Bull. Wld Hlth Org.*, 1972, 47, 257-264, 265-274.

ing shock, using plasma fractions containing high concentrations of these inhibitors.

5.23 Regarding transplantation, the Organization and the Transplantation Society co-sponsored the Fifth International Histocompatibility Workshop Conference, held in May in Evian, France, at which new information was presented indicating that the recognition by the immune system of histocompatibility differences between donor and recipient are controlled by a newly discovered genetic locus. In mice, this locus and the H-2 locus are closely related to the genetic locus controlling immune responses (the IR gene). It is expected that in the next few years extensive investigation will be devoted to the relationship between disease susceptibility, histocompatibility antigens, and the immune response. Immediately after that conference, a meeting was held of the

Committee for the Nomenclature of Leucocyte Antigens, which is composed of a number of specialists from many countries and is assisted by WHO and 14 laboratories that collaborate on a voluntary basis. This committee had previously proposed¹ a now widely accepted nomenclature for certain well recognized specificities within the HL-A system, and in May it drafted a revision and extension of that nomenclature in the light of recent developments. This draft was accepted in October at a meeting of a number of committees of the International Union of Immunological Societies, at which WHO was represented. The Organization participated in the Union's symposium on genes and antibodies, held in May in Norway; this was the second in a series of annual symposia convened by the Union.

¹ *Bull. Wld Hlth Org.*, 1968, **39**, 483-486.

6. ENVIRONMENTAL HEALTH

6.1 Pollution of the environment was one of the major issues of the year. The human race is increasingly exposed to pollution of the air, water and soil and to the nuisances and physical hazards associated with urban life and work, and the hazards to human health from such exposure have become of great concern, not only to scientists and public health administrations but also to people in general. Yet the greatest environmental challenge lies in the need to provide basic sanitary services to vast numbers of people in the developing countries. Where those basic services are lacking, biological pollution originating from human wastes affects human health through food, water and the vectors of disease. A survey conducted by WHO in 1972 with the participation of most of its Member States showed that more than half of the urban population and 88% of the rural population are still without a satisfactory water supply. Environmental sanitation—especially the provision of community water supply and wastes disposal facilities—therefore remains one of WHO's main objectives in the Second United Nations Development Decade.

6.2 More research is needed into the effects of environmental pollution to provide the essential scientific information for governments to be able to plan and implement pollution control and prevent further pollution from new industries. Such research involves the monitoring of environmental conditions in the air and in water, soil and food.

6.3 The outstanding occurrence of the year in environmental health was the United Nations Conference on the Human Environment, held in Stockholm in June, at which WHO was strongly represented. Its purpose was to identify environmental problems of international concern and to propose a plan of international collaborative action for their solution. The importance of the conference is indicated by the fact that a number of government ministers, including ministers of health, headed their countries' delegations. The conference stressed the need to improve health by improving environmental sanitation, and recommended high priority by development assistance agencies for water supplies, sewerage and public health and increased support to governments in improving water supply and sewerage services. It also recom-

mended the development of monitoring and epidemiological and experimental research programmes to provide data for the early warning and prevention of the deleterious effects of environmental agents and the assessment of their potential risk to human health. WHO should, it considered, coordinate the development and implementation of an appropriate international collection and dissemination system, and assist governments in coordinated programmes for the monitoring of air and water and the establishment of monitoring systems in areas where there may be a risk to health from pollution. The establishment of workings limits for environmental pollution was suggested, and WHO was called upon to establish primary standards for the protection of the human organism, especially from pollutants that are common to air, water and food. Other recommendations were for internationally coordinated programmes of research into and monitoring of food contamination by chemical and biological agents, for increased support to the Codex Alimentarius Commission in developing international standards for pollutants in food, and for action to arrest the pollution of the sea.

6.4 The proposals made in Stockholm are not a new beginning for WHO, but strengthen resolutions of the World Health Assembly and the WHO Regional Committees. The Twenty-fifth World Health Assembly in resolution WHA25.58 had confirmed the importance of most of the measures later advocated by the conference, and others of its resolutions contained specific recommendations about community water supply, food hygiene, water quality in international water resources, occupational health, and the medical uses of ionizing radiation.

6.5 The recommendations of the Stockholm conference and the various resolutions adopted by the World Health Assembly reflect the priority given to the promotion of environmental health in WHO's Fifth General Programme of Work, for 1973-77.¹ There it is recognized that there is no substitute for basic sanitation, with safe water supplies and wastes disposal as the key factors in the raising of standards of health and welfare and in the control of waterborne disease. Emphasis is placed on the control of environ-

¹ See *Off. Rec. Wld Hlth Org.*, 1971, No. 193, Annex 11.

mental pollution and nuisances as a means of protecting health and of avoiding disturbances in the ecosystem, and the need is stressed to establish environmental health standards, such as maximum permissible levels of pollutants in air, water, soil and food, and to help countries to develop national systems for gathering information and determining when and where preventive action is required. In this connexion, WHO published a wide-ranging survey of environmental hazards to human health,¹ for the benefit of health authorities and others concerned with environmental problems.

6.6 An interregional seminar on considerations of human ecology in environmental health, held in Geneva in July-August, discussed the sociocultural and technical aspects of community acceptance of and response to environmental health planning. The participants stressed the need for a better understanding of the influence of environmental change on man's wellbeing and of the social changes necessary to achieve the benefits of planning. They reviewed the ecology of human settlements in their epidemiological, biological, physical and socioeconomic aspects, and considered social, cultural and psychological influences with a view to ensuring that planning is not limited to the technical aspects.

Basic community sanitation

6.7 Endorsing global targets within the Second United Nations Development Decade, the Twenty-fifth World Health Assembly, in resolution WHA25.35, requested the Director-General to continue to accord high priority for technical assistance to Member States to enable them to achieve those targets—thus making for safe and ample water supplies in urban and rural areas for public and industrial uses and the hygienic collection and disposal of human excreta, refuse and industrial wastes.

Community water supply and wastes disposal

6.8 Many national and international water supply programmes are hampered by the lack of data on existing installations, possible new sources of water and the costs and benefits to the countries concerned. In 1971-72 a detailed survey of water supply conditions in 90 developing countries was carried out by WHO. The total number of people needing a community water supply service is summarized in Table 1.

Table 1. Population in 90 selected developing countries needing adequate community water supply services during the decade 1970-80^a

Population	Population not served adequately in 1970		Estimated population increase 1970-80	Estimated total population in 1980 needing adequate water supplies	
	No. (millions)	% of 1970 population		No. (millions)	% of 1980 population
Urban	232	50	251	483	68
Rural	1 026	88	272	1 298	90
Total	1 258	77	523	1 781	83

^a Adequate water supply is here considered to be service through house connexions (not public standpipes) for urban populations and reasonable access to safe water for rural populations.

6.9 The survey revealed that, although an additional 22.7 million people in urban areas and 10.6 million in rural areas were provided with safe water or with access to safe water in 1970, the progress did not keep pace with the increase in population. The progress in the provision of sewage disposal facilities lagged even further behind. United Nations estimates for urban and rural population growth show that during the Second Development Decade the growth in selected developing countries will be of the order of 32%, compared with the world average of 23% for the same period. The expected urban growth, 54%, is even greater.

6.10 Basing itself on the findings of the WHO survey, the Twenty-fifth World Health Assembly, while substantially retaining the target for the Second Development Decade—i.e., that all urban dwellers should have access and 20% of the rural population have reasonable access to safe water—revised the targets for both urban and rural water supplies. The new targets endorsed by the Assembly in resolution WHA25.35 are that 60% of all the urban population should be served by house connexions and 40% by public standpipes, and that 25% of the rural population should have reasonable access to safe water. The progress needed and the financial investment required to achieve these targets are shown in Table 2.

6.11 The study shows that the total average annual investment required will be of the order of US \$1320 million, and that the average annual investment rate in countries must be increased by 40% over the 1970 rate. Rural community water supply programmes will need double the annual investment made in 1970, or an annual investment of US \$280 million, as compared with US \$1040 million for urban programmes. The survey also revealed that the major obstacles to progress in community water supply, in

¹ World Health Organization (1972) *Health hazards of the human environment*, Geneva.

Table 2. Community water supply—estimated progress needed to reach goals during Second United Nations Development Decade in 90 selected countries

	Urban			Rural	Total (urban and rural)
	By house connexion	By public standpipes	Total	Access to safe water	
Estimated population to be served, 1980 (millions)	427 ^a	285 ^b	712	357 ^c	1 069
Population served, 1970 (millions) . . .	229	92	321	140	461
Additional population to be served (millions)	198	193	391	217	608
<i>Per capita</i> cost of construction (US \$) ^d	38	15		13	
Estimated cost of construction during Decade (millions US \$)	7 500	2 900	10 400	2 800	13 200
Funds invested, 1970 (millions US \$). .			807	138	945

^a 60% of 1980 urban population.

^b 40% of 1980 urban population.

^c 25% of 1980 rural population.

^d The *per capita* cost of construction is based on estimates of costs reported by the countries covered by the study.

order of importance, are: (1) insufficient internal financing; (2) lack of trained personnel; (3) an inappropriate administrative structure; (4) insufficient external financing; (5) an inappropriate financial framework; (6) insufficient production of local materials; and (7) an inadequate or outmoded legal framework.

6.12 The situation in the Region of the Americas is more encouraging. The development of water and sewerage services during 1972 continued to be as great as it had been in the past ten years and to receive high priority. The extent of international aid is shown by the fact that from 1961 to 1972 the international lending agencies provided more than \$1000 million (the contributions of the countries themselves being about one-and-a-half times that amount). Either through expansion or improvement of existing systems or through the construction of new water supplies, a population of nearly 100 million people has benefited.

6.13 The progress of water supply programmes in urban areas continued to be greater than in rural areas of Latin America. By the end of 1972, 80% of the urban population and 28% of the rural population were reported to have water supply services by house connexions or public standpipes. Most countries had rural water supply programmes well under way, many of them with financial assistance from the international financing agencies.

6.14 *Pre-investment planning.* To help Member States to overcome the obstacles mentioned above, which are impeding progress in the provision of safe water supply and wastes disposal facilities, WHO has

organized a pre-investment planning programme. The programme, as well as drawing on WHO's research, development and training resources, utilizes engineers, economists, financial analysts and managers with broad experience in public health; its aim is to study national community water supply and wastes disposal problems and to assist governments, within the context of their socioeconomic development policies, to plan rational programmes for constructing plants and institutions. WHO's intensive assistance to national efforts has already resulted in loans committed by external agencies and funds allocated by governments totalling the equivalent of US \$285 million. Projections to the end of 1974 include an additional US \$100 million.

6.15 The assistance given by WHO takes various forms. A government may be helped in preparing the details of a pre-investment study for community water supply and waste disposal facilities, as well as a formal request for UNDP assistance and, in due course, a tripartite project document. The details generally include studies leading to the drafting of a long-term master plan and to feasibility studies for proposed first-stage construction, which is sub-contracted out by WHO to consulting engineers and management specialists. During the field work, WHO periodically sends out project guidance missions to review progress and give guidance. Before the completion of the studies, a UNDP/WHO evaluation mission assesses the achievements and sometimes recommends a second phase of studies. Under the IBRD/WHO cooperative programme that was initiated in late 1971, a number of national sector studies

of water supply and sewerage facilities are being undertaken, with the aim of obtaining all the available information and suggesting a rational approach to planning national sector programmes in relation to engineering problems, financing, management, and health priorities.

6.16 In addition, the programme aims at assisting countries to identify, and prepare proposals for, pre-investment projects and to conduct related activities. As an essential step in accelerating national programmes, assistance of this kind was provided in 1972 to Brazil, Democratic Yemen, Fiji, Guyana, India, Iran, Iraq, Israel, Kenya, Malawi, Malaysia, Mali, Syrian Arab Republic, United Republic of Tanzania, Yemen and Yugoslavia. Governments were assisted by WHO in meeting the technical and economic criteria laid down by IBRD, international development agencies, regional development banks and bilateral agencies, in creating efficient administrative and management structures, and in training national staff to produce sound projects. UNDP was the major source of financing in the assistance given.

6.17 During the year, six UNDP/WHO pre-investment projects were completed in Ghana, Khmer Republic, Philippines, Sri Lanka, Turkey and Uganda. Eighteen projects were in progress during 1972 in Afghanistan, Algeria, Central African Republic, Gabon, Guyana, Iran, Iraq, Ivory Coast, Kenya, Madagascar, Mali, Malta, Morocco, Nepal, Nigeria, Senegal, Surinam and Yemen. Preparations were in an advanced stage for the initiation of projects in Congo, Democratic Yemen, Gambia, Ghana, Guinea, Lebanon, Liberia, Malaysia, Maldives, Rwanda, Syrian Arab Republic and Yugoslavia.

6.18 In the South-East Asia Region, WHO assisted in a feasibility study on the improvement of urban water supply in Indonesia (West Irian); in reviewing a number of feasibility studies; and in the preparation of a long-term urban water supply programme. Assistance was also given to Indonesia in making a sewerage study in Djakarta and preparing a request for UNDP assistance. A joint UNDP/WHO panel of consultants reviewed the progress of a UNDP project for water supply and sewerage for Greater Kathmandu and Bhaktapur in April and accepted a recommendation for an extended sector study to ensure coverage of more rural areas. In Sri Lanka, negotiations continued between the Government and external aid agencies for financial assistance for the implementation of some of the water supply systems designed under a UNDP project with WHO help. Maldives received assistance in the preparation of

a request for UNDP assistance for a water supply and sanitation programme for the capital.

6.19 In the Eastern Mediterranean Region WHO is executing agency for UNDP in the Teheran sewerage project, in which engineering operations for the disposal of industrial and domestic wastes started in April. The design of an expanded sewerage and drainage system was begun. A national waste management project for Lebanon, in respect of which pre-project activities were approved by UNDP, has also started. Two WHO missions visited Democratic Yemen and the Syrian Arab Republic to draft project documents for waste-water disposal in Aden and Damascus respectively. The Syrian project includes a water pollution control component for the cities of Homs and Hama. The water supply project for Sana'a and Hodeida, Yemen,¹ was visited by an IBRD pre-appraisal mission in February-March and by a UNDP/IBRD/WHO mid-project review mission in June-July.

6.20 In the African Region, WHO was executing agency for 17 UNDP-financed environmental health projects. The first phase of a project for water supply and sewerage in Abidjan, Ivory Coast, was completed, and a request for funds for the second phase was forwarded to UNDP. The second phase of a similar project for Accra-Tema, Ghana, was completed, WHO helping by providing a detailed plan of execution and administrative assistance. UNDP and WHO sent an evaluation mission to Senegal to examine a plan for water supply and sewerage in Dakar, the first phase of which has been completed.

6.21 Of a number of projects for economic development that contain environmental health components, three were completed in which WHO was concerned: the possibility of antimalaria measures was studied and an environmental health infrastructure was proposed for an integrated rural development programme in Burundi; recommendations were made about port sanitary services at Conakry, as part of a project for reorganizing the port; and technical aid was given in planning and executing environmental health projects in Dahomey, as part of an agricultural study and demonstration project in the Ouémé valley.

6.22 In the European Region, largely as the result of a WHO/UNDP pre-investment project, a loan of US \$48 million was granted to the Government of Morocco by IBRD for the construction of water supply facilities in the Atlantic coastal area from Casablanca

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraphs 19.102-19.105.

to Rabat. In Turkey, IBRD granted a loan of US \$37 million for the construction of water supply facilities proposed in the master plan for Greater Istanbul and feasibility studies prepared under a UNDP/WHO project that has now terminated. The IBRD loan to Yugoslavia for the construction of the Ibar-Leponac water project included a strong recommendation for the carrying out of studies and development of plans forming a part of a WHO/UNDP project in progress.

6.23 An important aspect of the UNDP/WHO-assisted projects is the establishment within the country of a basic organization to ensure the efficient functioning of the water supply and wastes disposal services for urban and rural populations, with the minimum of consultative assistance from WHO, when the project has been completed and the international personnel withdrawn. One of the primary aims, therefore, is to leave behind effectively operating institutions, with a cadre of capable staff, to plan, construct, obtain the required funds, and operate and maintain the facilities and services essential to the public health needs of the country.

6.24 *Rural water supplies and sanitation.* It is estimated that in 1980, notwithstanding the rapid growth of cities, fully two-thirds of the population of developing countries will still be living in rural areas. The emphasis in those countries on progress in rural areas explains the Twenty-fifth World Health Assembly's call, in resolution WHA25.35, on Member States and WHO to pay special attention to rural water supply and sanitation services. The effect is expected to be greater in countries where basic community sanitation programmes are specifically included in national socioeconomic development plans, as for instance in the Republic of Korea. It should also be enhanced by the participation of WHO regional offices in UNDP country programming, in which environmental health activities often occupy an important position.

6.25 So far, 96 countries have received coordinated assistance from UNICEF and WHO for rural water supply and sanitation projects. The emphasis has shifted in recent years from assistance to small groups of communities to assistance in developing and implementing countrywide programmes. The WHO/UNICEF-assisted community water supply and sanitation programmes under implementation in India, Indonesia, Nepal, Sri Lanka and Thailand continued as planned with increasing technical and material assistance. An assessment was made of the village water supply programme being executed in

several states of India, with particular reference to their design, construction, operation and maintenance. Assistance in rural water supply programmes was given to Malaysia, Nigeria, the Republic of Korea, the United Republic of Tanzania, and Yemen.

6.26 In the Western Pacific Region, under a UNDP-financed intercountry project, with material assistance from UNICEF, WHO continued to provide assistance to the British Solomon Islands Protectorate, Fiji, Gilbert and Ellice Islands, New Hebrides and Western Samoa in the implementation of rural water supply and sanitation projects. Guidance in the preparation of requests for UNICEF assistance was given to Botswana, Madagascar and Uganda. Governments also requested WHO advice on community water supply and sewerage projects in specific towns or on such questions as design and construction criteria.

6.27 In the Republic of Korea, a new advisory services project in community water supply and sewerage planning was initiated in 1972. In the Khmer Republic, technical assistance was given for the development of design and construction work for the water supply system of Kompong Som. A study was in progress on the improvement of water supply, sewerage and drainage in Phnom-Penh. In the Philippines, assistance was given to water supply studies for the provincial cities. In the Republic of Viet-Nam, assistance was given in developing a medium-term plan for water supply in the provincial cities.

6.28 The small-scale project referred to in the Annual Report for 1971¹ for the provision of water supplies to three villages in Kenya, using equipment and supplies furnished by voluntary contributions from the WHO Staff Association, was completed in 1972. A total of 3300 people in these three villages benefit from the water supplies, which also serve the schools, health centres and markets. New funds were made available by the WHO Staff Association for a similar project in another country yet to be chosen.

6.29 The cholera pandemic has shown the importance of surveillance of drinking-water quality, and this is implicitly stressed in resolution WHA25.35 of the Twenty-fifth World Health Assembly. A programme of systematic quality control was initiated in the Libyan Arab Republic. WHO supported research on the disinfection of well water by the Central Public Health Engineering Research Institute, Nagpur, India, and some of its procedures were effectively applied in Kenya and in Malaysia in about 60 shallow wells. As

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 5.59.

the provision of safe water is an essential measure for cholera control in emergency situations, the Organization supplied information on a portable unit, originally designed for the Government of Kenya with WHO help, for the supply of drinking-water in emergencies.

6.30 *Wastes disposal.* WHO has continued the preparation of a series of guidelines on the disposal of industrial wastes designed to help in the planning and implementation of control programmes, particularly in the developing countries, where the problem is assuming increasing importance. Guidelines issued during the year deal with livestock wastes and pulp and paper manufacturing wastes. Advice in this field included an industrial effluent survey in the Khartoum North area of Sudan.

6.31 A report on the use of oxidation lagoons for sewage treatment in Latin America was completed and distributed by the Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS), Lima. Initial arrangements were made to plan and carry out a survey on low-cost installations for the treatment of domestic and industrial liquid wastes in the Region of the Americas.

6.32 Advice on specific problems related to the disposal of solid wastes was provided at the request of a number of countries, including India, Israel and Tunisia. In the Americas, advisory services on the collection and disposal of solid wastes were provided to Barbados, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, and Haiti, with a view to preparing feasibility reports for submission to the Inter-American Development Bank or other international credit agencies. National plans were in preparation in Bolivia and Colombia in which a number of cities will be included, operating under a national agency. The programme in Argentina continued to operate very successfully, with additional provinces joining in the scheme.

6.33 In Singapore, assistance continued to be given in the field of sewerage planning through a UNDP-funded project which was extended for one year. A new small-scale project for WHO assistance to the Singapore Public Works Department in the development of plans for storm drainage and water conservation systems was approved by UNDP.

6.34 *Reference centres.* The WHO International Reference Centre for Community Water Supply, The Hague, Netherlands, with its network of 31 collaborating institutions, continued the collection and dissemination of technical information, notably through its monthly newsletter in English and French;

and it revised a paper on the small-scale purification of water that was originally issued by WHO in 1956 and has been brought up to date to incorporate new and simple techniques, some of which have been developed by the Centre.

6.35 The Centre collected information from a number of countries on the control mechanisms used to safeguard populations from toxic hazards arising out of the use of PVC pipes for the transport of drinking-water and of synthetic acrylamides as coagulant aids in the treatment of water. The information showed differences in procedures and standards in different countries. The emergency disinfection kit using crystalline iodine developed by the Centre has undergone further field testing, and design changes have been made as a result. The Centre also tested newly developed erosion-type chlorinators in the field.

6.36 The WHO International Reference Centre on Wastes Disposal's thesaurus of terms in solid wastes, completed in 1972, provides a standard terminology in this field and has permitted the establishment of a documentation system. A meeting of directors of institutions collaborating with the Centre was held in November at the Centre's host institute, the Federal Institute for Water Resources and Water Pollution Control, Dübendorf, Switzerland. It established a short-term and a long-term programme for research in the field of waste water and solid wastes.

6.37 The Centre organized training activities for research and other personnel from developing as well as developed countries, including holders of WHO fellowships who visited the Centre, as they do every year. The trainees included a group of students from the interregional centre for the training of French-speaking sanitary engineers jointly established by the Government of Morocco and WHO at the Mohamadia School of Engineering, Rabat, in 1969.

6.38 The Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS), Lima, which was set up in 1969 by the Organization and is now being assisted by the Government of Peru, was established to meet the increasing demands for technical advisory services in the various specialist fields devoted to the preservation and improvement of the environment in Latin America. Its research programmes include water supply, particularly through rural planning, water treatment and related subjects. Work was carried out through CEPIS in several countries in the Region of the Americas to lower the cost and facilitate the operation of water treatment plants through the utilization of new methods and

techniques. A symposium on new methods of water treatment, held at Asunción in August, brought together 140 engineers from 22 countries of the Region, who recommended modifying existing plants to take advantage of technical progress rather than building expensive new ones.

Housing and human settlements

6.39 A WHO Expert Committee on the Epidemiological Aspects of Housing and its Environment, that met in September-October, reviewed statistical and epidemiological data from various parts of the world on communicable disease, mental illness and home accidents in relation to the residential environment, assessed their epidemiological significance and implications for housing programmes, and considered the effect of the physical and biological aspects of the environment, man-made changes in environmental factors, and the social and economic circumstances of the population, including their beliefs, culture, and interpersonal relationships. The Committee recommended further study and research and stressed the need for planning authorities to have an understanding of the social and epidemiological aspects of housing. The Committee had before it the report of the WHO Scientific Group on the Development of Environmental Health Criteria for Urban Planning (1971).¹

Environmental health criteria and standards

6.40 Environmental health standards need to be based on knowledge of quantitative exposure/response relationships for all environmental factors in relation to the different groups of population exposed and different exposure levels. These relationships, however, are not known for any single pollutant, still less for combinations of pollutants, so that exposure limits have to be established on the basis of the best available knowledge. The promotion of international agreement on criteria for the quality of air, water, food and the working environment has been a WHO priority during the last decade and has resulted in recommendations on drinking-water standards, air quality criteria and guides in relation to common air pollutants, and acceptable daily intakes and tolerances for a large number of food additives, pesticide residues and other food contaminants.

6.41 During 1972 a programme was developed for collaboration between WHO and national institutions for: (1) the evaluation and assessment of existing scientific information on the effects of environmental

agents on health, as a basis for the development of environmental health criteria and standards; (2) the promotion and coordination of national research and related activities to improve the basis for environmental health criteria and standards; and (3) the identification of new environmental hazards to public health. Among factors considered in establishing priorities for this programme were the severity of the adverse effects on the whole population; the stability of agents in the environment, their resistance to degradation and metabolic detoxification, their accumulation in the food chain and their metabolic change into more toxic products; the abundance of the agents in the human environment, particularly of those occurring naturally or produced inadvertently; the demographic characteristics of the populations exposed; the frequency and magnitude of exposure in general and of highly susceptible population groups in particular; the feasibility of control and prevention; and the degree of control already achieved and the extent of knowledge already available. Specialists from 12 Member States met in Geneva in November, reviewed this programme, made proposals for its implementation, indicated priorities, and suggested working arrangements for the strengthening and expansion of international cooperation. They held that environmental health criteria, primary protection standards and derived working limits are an essential basis for action against pollution, for the establishment of national standards and for the evaluation of environmental control programmes, as well as for the harmonizing of the environmental control policies of governments. The success of the WHO programme was contingent on international collaboration in the use of all the information and capabilities available within Member States. The meeting suggested direct consultation with interested governments with a view to eliciting their contributions towards the development of environmental health criteria and to identifying the national resources, including institutions and qualified scientists, that could be made available for the implementation of the programme. Governments, it was felt, should undertake and encourage research, gather and provide WHO with data on health effects as well as with any other information that would help in identifying new and unforeseen environmental hazards to public health, and envisage financial support for such activities within their countries.

6.42 Promotion of international agreement on environmental health criteria and standards is dependent on the comparability of the methods applied in environmental health studies. At present, they are not uniform and the results are not comparable. As a

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 511.

step towards remedying this situation, a meeting was organized by WHO in Moscow in December to discuss the methods used in the USSR for establishing biologically safe levels of chemicals in the environment. The meeting reviewed the methodology followed in investigating the effects on man of exposure to toxic agents and in establishing dose-response relationships; the applicability of the results of animal experimentation to man; and methods of establishing maximum permissible concentrations of toxic substances. Consideration was given to the development of environmental health criteria and standards for the exposure of workers to toxic agents in the working environment and to the establishment of general environmental criteria.

Evaluation and control for specific exposures and conditions

6.43 The evaluation of environmental health programmes is a problem of growing importance for developing and developed nations alike. A WHO Expert Committee on National Environmental Health Programmes¹ had emphasized in 1969 the importance of evaluation for analysing the results of programmes in relation to goals, measuring the benefits against costs or the outputs against the inputs, and determining the relevance of programmes to health problems. In June 1972 a WHO Scientific Group on the Evaluation of Environmental Health Programmes that met in Geneva studied the technical and administrative factors involved in assessing the results of environmental health programmes, the advantages and shortcomings of existing evaluation methods and the use of recently developed evaluation techniques. The group concluded that the stage has been reached where evaluation methods and technology can be used for the assessment of environmental health problems, control operations and their effects and, to a limited extent, the effectiveness of programme implementation. It called attention to the need for improvements in methods of measuring the physical achievements of environmental health programmes, economic analysis, the collection of data on environmental health activities and accomplishments, and the training and development of manpower.

Air pollution

6.44 A WHO Expert Committee on Air Quality Criteria and Guides for Urban Air Pollutants² that met in April considered the epidemiological and other

evidence of effects on man and his environment of sulfur oxides and suspended particulate matter taken together, carbon monoxide, photochemical oxidants and nitrogen dioxide. It proposed air quality levels involving varying degrees of health risk for each of the pollutants considered except nitrogen dioxide, for which there is insufficient knowledge at the present time to draw firm conclusions. It also put forward suggestions for long-term goals, on the ground that the development of national air pollution standards should include both standards to be met within a few years and long-term standards, the former in some countries being tolerable levels preventing illness and death in susceptible subgroups of the population, the latter protecting against all effects of significance to human health, including genetic change.

6.45 As a further step in the collaborative effort to develop air pollution monitoring programmes, WHO, together with its International Reference Centre on Air Pollution Control, prepared a programme for the uniform recording and processing of aerometric data. The technical and organizational arrangements for the programme were finalized at a meeting held at Research Triangle Park, North Carolina, USA, in November. A data user's guide was prepared and distributed to all the reference centres and collaborating institutions and laboratories and a pilot study was started at a number of monitoring sites to monitor sulfur dioxide and suspended particulate matter and measure the soiling index. At the same meeting a series of monographs on methods proposed for the routine measurement of sulfur dioxide, suspended particulate matter, sulfuric acid aerosol, carbon monoxide, oxidants and oxides of nitrogen were reviewed. Comparison procedures for the calibration of routine measurement methods for sulfur dioxide and suspended particulate matter were recommended; they will allow monitoring results from different parts of the world to be compared on a uniform basis. This programme is implemented through the WHO reference centres and collaborating institutions on air pollution.

6.46 In the European Region information on the health effects of air pollution was compiled through critical reviews of the literature. Information was sought on the effects of heavy metals and metalloids on man and the environment as well as on the long-term effects on health of air pollution. The procedures and questionnaires agreed on by a group that met in Copenhagen in February to review a study on chronic respiratory diseases in children were tested on a limited sample of children in pilot areas in Czechoslovakia and Poland.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1970, No. 439.

² *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 506.

6.47 A South-East Asia regional seminar on air pollution control was held at the Regional Reference Centre on Air Pollution, Nagpur, India, in December.

Water and water pollution

6.48 Recreational areas are important for the general health and wellbeing of the community; and coastal areas, which every year receive millions of holiday-makers, deserve particular attention. The risk to health from the use of polluted recreational waters was discussed by a WHO meeting held in March at Ostend with the collaboration and support of the Government of Belgium. Apart from a modest amount of enteric infection ascribed during the past half century to sea bathing, the evidence for any significant health risk associated with bathing in polluted water in temperate climates did not appear to the meeting to be conclusive. It stressed, however, that bathing in polluted water in a temperate climate is not the same as in a warm climate—for example, the Mediterranean—where the duration of exposure to pathogens in the sea is likely to be far greater. A tentative guideline was suggested for the bacteriological grading of bathing beaches. The meeting also held that the beach and sea should not be considered in isolation from other public health requirements for coastal towns.

6.49 Continuous monitoring is needed to ensure that standards for the various uses of water are met. An effective water monitoring² programme makes it possible to compare changes in the chemical and biological quality of rivers and other water bodies and to establish control priorities. The Twenty-fifth World Health Assembly addressed itself to this problem in resolution WHA25.43.

6.50 WHO participated in the fourth session, held in Geneva in September, of the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), sponsored by the United Nations, FAO, UNESCO, WHO, WMO, IMCO, and IAEA. The group further elaborated the list of harmful chemical substances and discussed marine toxicological problems with particular reference to the health aspects, the transportation and degradation of pollutants by microbial activity, the pollution of the sea from the atmosphere, and methods of treatment and disposal of sewage and industrial wastes. A special item of the agenda was devoted to the principles involved in developing coastal water quality criteria.

6.51 Assistance in the field of water pollution control continued to be provided through the Pan

American Centre for Sanitary Engineering and Environmental Sciences to many countries in the Region of the Americas. Examples are several river basin development agencies in Colombia, the Guayas River basin development project in Ecuador, the River Plate Basin Commission, and the Aconcagua River basin project in Chile.

6.52 A number of chemical substances in drinking-water may constitute a danger to health if present above certain concentrations. *International Standards for Drinking-Water*¹ sets out allowable daily intakes for a number of toxic metals including lead, cadmium, arsenic, mercury and selenium. WHO requested the Water Research Association, Medmenham, United Kingdom, which collaborates with the WHO International Reference Centre for Community Water Supply, to investigate the possibility of conventional water treatment processes removing certain toxic metals and, if necessary, to develop processes aimed specifically at their removal. Studies carried out in 1972 concentrated on the removal of lead and cadmium by coagulation with aluminium sulfate from a hard and a soft water containing twice the concentration of these toxic metals recommended as allowable in the *International Standards*. The method was effective in reducing the concentration of both substances to below the limits recommended. The Association has also, with WHO support, undertaken an investigation into the removal of nitrate from drinking-water.

6.53 Draft manuals on the health hazards of arsenic, manganese, lead, cadmium and mercury were prepared by specialists from the Institute of Occupational Health, Helsinki, and the Swedish Institute for Public Health, Stockholm, and reviewed in April by a WHO working group in Helsinki. The working group also discussed existing standards for permissible concentrations of these metals in drinking-water and proposed research to fill gaps in knowledge.

6.54 A working group met in Bilthoven, Netherlands, in December to study the hazards to health and the ecological effects of pollution of the North Sea.

*Food additives and contaminants*²

6.55 *Toxicological evaluation.* Potential health hazards in food include food additives, pesticide residues and contaminants. At the request of the Codex Alimentarius Commission, the Joint FAO/WHO

¹ World Health Organization (1971) *International Standards for drinking-water*, Geneva, 3rd ed.

² See also paragraphs 1.225-1.233 for other aspects of food hygiene.

Expert Committee on Food Additives, which met in Geneva in April,¹ dealt in detail with mercury (including methylmercury), lead and cadmium, food contaminants that may cause severe irreversible and even fatal effects if ingested in sufficiently large amounts. The committee established provisional tolerable intakes, expressing them on a weekly basis because of the cumulative nature of these substances and their uneven distribution in the diet, and provisionally because of the uncertainty concerning the degree to which individual adults vary in their susceptibility, the special susceptibility of the fetus, neonate, and child, the difficulty of establishing subclinical indices of effects as distinct from measurements indicating exposure, the possibility of genetic effects, and the potential biological interaction of heavy metals with each other and with other chemicals.

6.56 The committee was asked to evaluate the safety of certain food additives in the light of new information casting doubt on them. Because of the possible teratogenic and carcinogenic effects of the colouring agent amaranth, it reduced the acceptable daily intake allocated to it at an earlier meeting and made it temporary pending a review of the data. Certain beverages treated with diethyl pyrocarbonate have been found to contain urethane, a potential carcinogen; the committee therefore recommended certain restrictions on the use of this otherwise valuable preservative. It also recommended restrictions on the use of another preservative, octyl gallate, in view of the finding that it may produce hypersensitivity in certain individuals.

6.57 The WHO Expert Committee on Pesticide Residues met jointly with the FAO Working Party of Experts on Pesticide Residues in Rome in November. Eight pesticides important to the health of consumers and to international trade in food were considered for the first time, at the request of the Codex Alimentarius Commission. They were bromophos, bromophos ethyl, carbophenothion, chlorpyrifos, fensulfothion, methidathion, monocrotophos and phosalone, all anticholinesterase pesticides. Acceptable daily intakes or temporary intakes were established and tolerances and/or practical residue limits recommended for all of them. Twenty other pesticides were reevaluated.

6.58 Quantitative and qualitative analyses of pesticides in various food products and human and animal specimens from Central America and Panama continued to be carried out in increasing numbers during the year at the Food Reference Laboratory,

Institute of Nutrition of Central America and Panama, in Guatemala.

6.59 *Food standards.* The Codex Alimentarius Commission, the principal organ of the Joint FAO/WHO Food Standards Programme, is responsible for the elaboration of food standards. Two series of Recommended Codex Standards were transmitted to Member States and some 30 replies were received indicating various degrees of acceptance. In addition, a number of codes of hygienic practices and methods of analysis were sent to Member States for information.

6.60 The ninth session of the Commission met in Rome in November and adopted a series of Recommended Codex Standards, a Code of Practice and Methods of Analysis. It also adopted the General Principles for the Use of Food Additives and decided that they should be included in the third edition of the *Codex Alimentarius Procedural Manual*.

6.61 *The assessment of consumer risk.* To assess the consumer risk of chemicals in food, the actual intake needs to be compared over a sufficiently long period with the acceptable intake. WHO estimated the potential intakes of 54 food additives and 35 pesticides, using a computer procedure suggested by a Joint FAO/WHO Expert Committee on Food Additives. Both the committee and the Codex Alimentarius Commission suggested, however, that in certain cases the procedure might need to be refined. Following their suggestion, a meeting of experts involved in such estimates at national level was convened in Geneva in October. They suggested that, where a food additive could not be endorsed because the potential intake exceeded the acceptable intake, a further estimation might be made, taking into account such factors as the actual use pattern and the possible breakdown of the substance. On the other hand, the potential intake might represent a gross underestimation of the actual intake, especially for additives in such foods as confectionery and beverages when consumed in quantities greatly exceeding the average in the general population. The experts suggested that the actual consumption patterns of certain food by special segments of the population should be determined by nutritional surveys.

6.62 In pursuance of resolution WHA23.50 of the Twenty-third World Health Assembly, concerning the health hazards of food additives, seven circulars were issued in 1972 giving information on prohibitions or limitations on the use of food additives by Member States. Since the establishment of the food information service a total of 14 circulars have been issued.

6.63 The systematic collection of existing toxicological and related data on food additives, pesticide

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 505.

residues and contaminants has been undertaken by WHO. In addition, steps have been taken to obtain other essential data. For example, observations made on laboratory animals at the WHO Collaborating Laboratory on Toxicology in Albany, N.Y., USA, suggested a higher susceptibility of neonates and young children to methylmercury. Work was begun in that laboratory on carrageenan, one of the most widely used thickening agents in processed foods, on the basis of preliminary observations in rabbits showing that carrageenan causes ulceration of the colon.

6.64 Four Joint FAO/WHO Collaborating Laboratories on Food Colours were designated following a recommendation of the Joint FAO/WHO Expert Committee on Food Additives. During 1971-72 collaborative studies were completed on turmeric, curcumin, and the chlorophyllin copper complex. The continuous exchange of analytical results and their evaluation have permitted a satisfactory standardization of these products, which will serve as reference samples to national laboratories in Member States.

6.65 The preliminary results of WHO-assisted research on methylmercurial compounds in the Toxicological Department, National Institute of Hygienic Sciences, Tokyo, have confirmed the cumulative toxicity of these substances to the central nervous system in monkeys. Assistance was given to the Institute of Hygiene and Public Health, Bucharest, to carry out epidemiological studies on the possible adverse effects of pesticide residues in food in populations with different exposures.

6.66 A meeting on the legal aspects of irradiated food was convened by WHO in Geneva in November, in conjunction with FAO and IAEA. Guidelines for Member States were prepared for the protection of the consumer's health and for facilitating international trade in irradiated food.

6.67 Assistance was given to the Institute of Hygiene and Epidemiology, Brussels, to determine whether wheat irradiated at 75 000 rad had any cytotoxicity in the mouse. Such an effect had been shown previously at the same institute with wheat irradiated at 5 megarad. Further assistance was given to the Postgraduate Institute of Medical Education and Research, Chandigarh, India, for work on the effect of irradiated food on reproductive physiology in monkeys.

6.68 A proposal for research on and surveillance of marine biotoxins in food fish was submitted to UNDP in December 1971. During 1972 further information was compiled on the adverse effects such toxins have

on health and the economy, and a meeting of experts was held in Geneva in September to review the proposal in the light of the data collected.

6.69 A consultation in October reviewed ways and means of implementing resolution WHA25.59 of the Twenty-fifth World Health Assembly in relation to the control of food contaminants and more active participation in the Joint FAO/WHO Food Standards Programme.

6.70 A number of countries were helped with national food control programmes, including food legislation and control laboratories. In Zambia, help was given for drafting of new legislation for food and drug control, and in Thailand advice was furnished on measures to strengthen food control.

6.71 A new *WHO Food Additives Series* began publication during the year and three volumes have appeared,¹ on the toxicological evaluation of some enzymes, modified starches and certain other substances, on specifications for the identity and purity of some enzymes and certain other substances, and a review of technological efficacy of some antioxidants. The first volume of another new series, *WHO Pesticides Residues Series*, was also prepared for publication—on the evaluation of some pesticide residues in food. These two series are prepared jointly with FAO, the evaluation for the first being approved by the Joint FAO/WHO Expert Committee on Food Additives and for the second by the Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues.

Radiation exposure

6.72 *Exposure in radiation medicine.* The exposure of populations to man-made radiation occurs particularly in X-ray diagnosis. This is especially true for industrialized countries where, on the average, nearly everyone is submitted once a year to radiological examination. In many developing countries, however, the frequency of such examinations is a tenth or less of the frequency in developed countries. There is, however, some evidence to the effect that the radiation dose per exposure is much higher in many developing countries, because of the lack of modern equipment and deficiencies in the training of staff, particularly in the field of radiation protection. More radiological services are required throughout the world for regional and district hospitals and radiotherapy and nuclear medicine centres, and their efficiency and safety are of great importance. WHO

¹ *Wld Hlth Org. Food Add. Ser.*, 1972, No. 1, 2 and 3.

therefore devotes considerable attention to the strengthening of such services.

6.73 In many places radiological equipment is unused because of minor mechanical or electrical faults that could often easily be repaired on the spot by suitably trained staff. Technical assistance to help remedy this situation was given to Burma, Democratic Yemen, Egypt, Iraq, Sri Lanka and several countries in Africa. Expert advice on the setting up of radiation protection services was given to Argentina, Brazil, Colombia and other Latin American countries.

6.74 An International and a Regional Reference Centre for Nuclear Medicine were designated in 1972 in Heidelberg, Federal Republic of Germany, and Bombay, India, to deal with problems of method and application. Technical assistance was provided to nuclear medicine projects, particularly in India, and, in connexion with the improvement of radiotherapy, in Iran, Jordan, Kuwait and Sudan.

6.75 WHO participated in an international symposium in Otaniemi, Finland, in August on the planning of radiological departments, organized by the Radiological Society of Finland in cooperation with the European Association of Radiology.

6.76 Results from the postal dose intercomparison service for radiotherapy centres started by IAEA in 1968 and joined by WHO in 1970 showed deviations up to 50% from the intended dose. This demonstrates the importance of dosimetry and the need for extending this service, which at present covers only cobalt-60 radiation, to conventional X-ray therapy and high voltage radiation. Six institutes from the Americas, 21 from the Eastern Mediterranean, 48 from the European Region, 8 from South-East Asia and 37 from the Western Pacific—in all 120 institutes—participated in the intercomparison in 1972. Technical assistance was provided to several countries in the Eastern Mediterranean and Western Pacific Regions for checking and calibrating conventional X-ray therapy and cobalt-60 units in radiotherapy centres.

6.77 A network of secondary standard radiation dosimetry laboratories that had been set up in 1968 was expanded in 1972. There are now WHO Regional Reference Centres with calibration facilities in Argentina, Iran, Mexico, Romania and Singapore.

6.78 A problem in radiotherapy is the difference in the therapeutic effect depending on the fractionation of the total dose by time. A group of experts that met in June in Geneva drafted guidelines for the dose-time

relationship. They are being circulated for comment and criticism.

6.79 Another urgent problem is the application of sealed radioactive sources for intracavitary treatment, particularly of uterine cancer. The trend is now to replace radium by other radioisotopes and to employ the after-loading technique, which reduces the radiation exposure of the staff and at the same time offers the possibility of greater accuracy. A group of experts met in Geneva in February to explore ways of improving the method and of making it available to developing countries. WHO supported research on the subject in a hospital in the United Kingdom.

6.80 The use of radiation and radioisotopes for research in man has legal and ethical aspects. They were discussed at a consultation, held in Geneva in November in collaboration with ILO and IAEA, in which it was recommended that national and local committees should be set up to deal with individual cases.

6.81 *Other sources of exposure to radiation.* The worldwide exposure of populations to radioactive fallout from atomic weapon tests is still the subject of research and investigation, although this has been decreasing considerably in recent years. In order to complete the data on the strontium-90 content of the human body, WHO continued its programme of human bone sampling in cooperation with UNSCEAR and several laboratories in the Federal Republic of Germany, France, the USA and the USSR, as well as with pathological institutes in 10 countries in Africa, South America and South-East Asia. The results so far show very low figures, generally less than 1 pCi per gram of calcium in Asian countries and rarely exceeding 2 pCi in South American countries.

6.82 Technical advisory services and assistance in the provision of supplies and equipment needed for basic radiation measuring instruments and personnel dosimetry equipment were furnished to ten countries in the Americas—Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Jamaica, Panama, Peru and Venezuela.

6.83 WHO continued to coordinate the programme started in 1962 for sampling the environment for radioactive pollutants. Samples were collected in various countries and sent for analysis to the United States Environmental Protection Agency laboratory, Montgomery, Ala. Air samples were collected in Argentina, Bolivia, Chile, Colombia, Ecuador, Guyana, Jamaica, Peru, Trinidad and Tobago, and Venezuela, and milk samples in Chile, Colombia, Ecuador, Jamaica, and Venezuela.

6.84 By the end of 1971, there were 112 nuclear power reactors in 15 countries with a total installed capacity of about 27 000 MWe. There are an additional 70 plants at present under construction with a total installed capacity of about 45 000 MWe which are expected to begin operation by the end of 1973. Accordingly, of the various peaceful applications of nuclear energy, power production systems have become the largest potential source of radioactive contamination of the environment.

6.85 Nuclear plants may affect public health through the disposal of radioactive wastes and heat, reactor defects and the transport of radioactive materials. The problems they raise are discussed in a volume prepared by IAEA in close collaboration with WHO.¹ Since data on radioactive discharges, particularly from reprocessing plants, are scanty, a scheme was proposed jointly by IAEA and WHO for the recording of environmental releases of radioactivity of global significance. IAEA and WHO also co-sponsored a meeting in Vienna in November that prepared guidelines on environmental monitoring programmes and the assessment of the significance of environmental contamination. WHO collaborated with IAEA in the publication by the Agency of a guide on the disposal of radioactive wastes into rivers, lakes and estuaries, and on guidelines for the selection of facilities for the disposal of radioactive concentrates and for their surveillance, elaborated at a panel in Moscow in September. WHO also collaborated with IAEA in revising the existing IAEA regulations for the safe transport of radioactive materials; particular emphasis was placed on container traffic.

6.86 With the International Reference Centre on Environmental Radiation, Le Vésinet, France, a programme was prepared for the surveillance of radionuclides in foodstuffs and the human diet. Sources and pathways of foodstuff contamination and the establishment of health standards in regard to radioactive substances in the diet were taken into consideration. The programme is designed for use by health authorities as a basis for the preparation of instructions on or guides to radiation surveillance. The Centre also has a programme comparing radioisotopes in environmental samples, chiefly milk and bone. Four reports have been issued on milk contamination by strontium-90 and cesium-137 in selected countries.

6.87 WHO co-sponsored with IAEA a meeting in Vienna in October-November on the preparation of

a guidebook on the safe use of radioactive tracers in industrial processes. Recommendations on the measurement of low-level radioactivity published by the International Commission on Radiation Units and Measurements (ICRU) were made with WHO's cooperation. In November, WHO participated in an IAEA Study Group Meeting on Radiological and Environmental Protection in Istanbul.

6.88 The early detection of biological, environmental and occupational effects of exposure to ionizing radiation is still a problem. The analysis of chromosome aberrations in lymphocytes has proved to be a more sensitive method than any other biological, biochemical or medical test, although it is not yet suitable for large-scale application. WHO's co-ordinated research into the method involves 28 participating laboratories throughout the world and has been strengthened by the designation of three international reference centres (in Canada, the United Kingdom and the USSR) dealing with different aspects of the problem and, in particular, harmonizing the methodology and reviewing the results. A meeting of investigators engaged in this programme was held in December in Mol, Belgium, with the support of the Belgian Government, and a manual on chromosome aberration analysis was finalized.

6.89 Epidemiological studies are continuing on the somatic-stochastic effects of radiological investigations with thorotrast on patients and similar studies are being considered for the occupationally exposed and patients undergoing X-ray diagnostic procedures.

6.90 WHO continued its international film badge service for personnel monitoring, organized with the assistance of the Central Protection Service against Ionizing Radiation, Le Vésinet, France, and the Radiation Protection Institute, Neuherberg, Federal Republic of Germany. It distributed film badges free of cost to Afghanistan, Democratic Yemen, Egypt, Ethiopia, Lebanon, Libyan Arab Republic, Pakistan and Sudan in the Eastern Mediterranean Region and to Laos and other countries in the Western Pacific Region.

6.91 As a follow-up to the meeting of the working group on the health effects of ionizing and non-ionizing radiation held at The Hague in November 1971, information was collected for the preparation of a directory of institutions in the European Region active in non-ionizing radiation work.

Accidents

6.92 WHO participated in the Fourth International Congress on Traffic Medicine, organized in Paris in

¹International Atomic Energy Agency (1972) *Nuclear power and the environment*, Vienna.

September by the International Association for Accident and Traffic Medicine (IAATM). During the congress a WHO/IAATM working group studied the scope and contents of a guide on the medical examination of drivers.

6.93 WHO also participated at a meeting in Geneva in October of a group of experts on road traffic safety of the ECE Inland Transport Committee, which revised the existing questionnaire on road traffic accident statistics.

6.94 In November WHO convened a consultation to explore the problem of vision and visual defects in drivers and suggested standards for different visual functions that should be considered—such as visual acuity, colour discrimination, field of vision, eye accommodation and light perception.

6.95 Following the recommendation of the WHO Regional Committee for the Americas in 1971, two seminars on traffic accidents in that Region were held—one in Aguascalientes, Mexico, in July, and the other in Caracas in November. The participants, from 20 countries, were drawn from ministries of health, public works and labour, police departments, federal highway administrations, and social security agencies. Among the topics discussed were the epidemiology of traffic accidents, alcoholism, drivers' licences, highway education, traffic engineering, national coordination for the prevention of traffic accidents, legislation, and medical emergency services.

Exposure to health risks at work

6.96 In 1972 WHO organized field investigations in Egypt, Japan, Sweden and Yugoslavia on the exposure of workers to carbon disulfide, hydrogen sulfide, vanadium and industrial solvents. Research continued in Egypt and Yugoslavia with a view to establishing dose-response relations in carbon disulfide exposure and determining the upper permissible limits in the wide range of industries using this substance. Assistance on research in exposure to industrial solvents was given to the National Institute of Occupational Health, Sweden.

6.97 In the Region of the Americas, an intercountry study on exposure to manganese in mining and manufacturing industries in Chile and the USA was organized with assistance from the United States National Institutes of Health. The purpose of this prospective study is to develop methods of evaluating the degree of exposure to manganese dusts and fumes in mining and the metallurgical industry and the

neurological manifestations experienced by workers exposed to them.

6.98 Special attention still needs to be given to the amount of physical work performed by workers exposed to heat. Investigations were begun in 1972 on the effect of heat stress on the blood and on circulatory changes in workers in mining operations at high altitudes in Bolivia and industries in India and Egypt.

6.99 In 1972 WHO-supported studies in Thailand showed that chronic obstructive lung disease and asthma affect 10% of rice-milling workers exposed to concentrations of dust exceeding 3 mg per m³ of air. Irritation and respiratory allergic reactions occur frequently in workers in tobacco sorting and blending and in cigarette manufacture. Research started in Sri Lanka in 1972 confirmed that respiratory irritation may occur in tea blending and sifting. Other WHO-supported studies of respiratory diseases caused by vegetable dusts started in Mexico, Thailand and Turkey. Guidelines for epidemiological research were prepared and the diseases resulting from such exposure were tentatively classified at a consultation in Geneva in August into non-specific irritation caused by dusts of sisal, hemp, tea and paprika, impairment of lung function and ventilatory capacity caused by pharmacologically active principles in dusts of cotton, flax and soft hemp, and allergic respiratory diseases resulting from dusts of bagasse, mouldy hay (farmer's lung), flour, and cedar and redwood sawdust. Other respiratory diseases may occur among workers exposed to vegetable and other organic dusts, the etiological factors and the mechanism of action still being far from being known for many of them.

6.100 Workers in every occupation are exposed to multiple stresses and yet very little is known of the outcome of the interaction of stresses. A study on the effects of combined stresses on workers' health started in 1972 in Bulgaria and Finland, and a consultation was held in Geneva in August.

6.101 *Promotion of workers' health.* The Twenty-fifth World Health Assembly in resolution WHA25.63 recommended that Member States give appropriate attention to the development of occupational health services as an integral part of national health programmes, study the health problems of workers in industry, agriculture, mining and other trades and provide an adequate infrastructure in the national health services, especially in developing countries, to enable them to undertake their responsibilities in occupational health. In 1972 more than 50 countries

throughout the world received direct assistance from WHO for occupational health and research, special emphasis being placed on ill health that may not be occupational in origin but is influenced by work factors, the collection of data and the development of occupational health services in developing countries, and the study of health problems in different occupational sectors.

6.102 A consultation held in Geneva in October stressed the importance of mental health in industry, vocational placement and rehabilitation of the mentally handicapped, research on the control of alcoholism and drug abuse in industry and the role of prevention.

6.103 The relationship between cardiovascular disease and work stress has not been sufficiently investigated, although it is known that certain work factors may aggravate hypertension. In the course of a research project started in 1972 with WHO participation, more than 50 000 workers in a large chemical industry in the Federal Republic of Germany will be examined for cardiovascular disease at the same time as systematic job analysis is carried out.

6.104 In 1972 a field project in occupational nutrition and industrial feeding started in Zambia with UNDP financial aid and FAO/WHO technical assistance. The aim is to organize the industrial feeding of workers in a way that will meet the physical requirements for the work and eradicate malnutrition in the working population.

6.105 Research on workers' health in small industries continued with WHO assistance in Brazil, Jamaica, Nigeria, Republic of Korea, Singapore, Sudan and Thailand. It has been shown that in some countries most of the working population in small industries suffer from a wide variety of diseases of occupational and non-occupational origin and have inadequate preventive and curative health care. In November and December national seminars were organized in the Western Pacific Region on the organization of occupational health services for small industries in the Republic of Korea and Singapore, with ILO participation. The seminars were preceded by country surveys on the health conditions of workers in those industries and followed by recommendations for the development of occupational health services and of occupational health centres. Thailand received assistance from WHO in developing a centre which at present is providing health services to more than 900 workplaces, and Singapore advice on the operation of preventive activities in small industries, particularly

the abatement of dust in stone quarries. The Republic of Korea is at present developing 12 such centres.

6.106 WHO continued to assist the pilot Health Centre for Seafarers in Gdynia, Poland, which is collecting standardized morbidity statistics on international seamen calling at Gdynia as a step towards the health monitoring of seafarers and the planning of marine health services. The Centre is expanding its capacity to assist and train marine health personnel from different parts of the world.

6.107 WHO made studies of occupational health in agriculture in Canada, France, Japan, Poland and the USSR. At the Institute of Labour Hygiene and Occupational Diseases, Kiev, USSR, research began on guidelines to safety and health in agricultural work, of growing importance now that mechanization of agriculture is spreading in the developing countries.

6.108 Many governments requested WHO assistance in the development of their occupational health services, in relation to, for example, the strengthening of centres emphasizing prevention, the development of postgraduate university courses and occupational health legislation. Assistance was provided to, among others, Argentina, Barbados, Bolivia, Burma, Chile, Colombia, Cuba, the Dominican Republic, Guinea, India, Iraq, Israel, Peru, Philippines, Republic of Korea, Sri Lanka, and Togo. Some projects, for example in Indonesia, were carried out with the participation of ILO, while others, in Bolivia, Bulgaria and Poland, included the establishment, with UNDP help, of occupational health institutes and courses.

6.109 Other projects were concerned with specialized fields in occupational health. For instance, in Botswana and Singapore assistance was given for the establishment of centres for the control of silicosis among miners.

6.110 In environmental and work physiology an *Introduction to Ergonomics* was published in 1972.¹ It reviews the principles involved in suiting man to the machine and the machine to man and in improving work performance.

6.111 In the Region of the Americas assistance was provided in the development of medical departments for the treatment of occupational diseases in Bolivia, Guatemala and Uruguay. In July a meeting of

¹ Singleton, W. T. (1972) *Introduction to ergonomics*, Geneva, World Health Organization.

investigators was held in La Paz to review the physiological aspects of work at high altitudes; it is discussed more fully in paragraph 4.27.

6.112 WHO participated in Geneva in May in the ILO meeting of experts on the control and prevention of occupational cancer and the meeting of the ILO *ad hoc* Committee on the Occupational Safety and Health Programme. Meetings took place to coordinate field projects of common interest. The Organization also participated with ILO in a project aiming at pollution control in the working environment in Kuwait.

Promotion of services and institutions

6.113 The strengthening of services and institutions responsible for the planning, implementation and coordination of environmental health services remains a major problem for many Member States. In some countries institutional arrangements are either lacking or inadequate. The organization of environmental health services is often hampered by the fragmentation

of control among a multiplicity of government departments and agencies and the dearth of qualified personnel. In some developed countries a wide gap has been noted between the advanced technology available for the control of environmental pollution and the surveillance of environmental quality and its application to the protection of the health and living conditions of the population.

6.114 In 1972 WHO laid emphasis not only on strengthening or building up environmental health services, as in Afghanistan, Ethiopia, Ivory Coast, Libyan Arab Republic, Mali, Morocco, Tunisia, and Zaire, but also on promoting cooperation between government departments concerned with such related fields as water resources, irrigation, drainage, housing, and city and regional planning. For instance, in Saudi Arabia, WHO assistance went equally to the Ministry of Health and the Ministry of the Interior, the latter being in charge of municipal sanitary engineering works. All environmental health projects included substantial technical assistance for the planning and initiation of sound administrative and organizational structures.

7. STRENGTHENING OF HEALTH SERVICES

Community health services

7.1 From the debate at the Twenty-fifth World Health Assembly on the subject of research in the organization of community health services it was clear that the organization of health services and the development of health delivery systems were the major health problems to be solved; in view of the past decade's experiences, new solutions might be required; on the other hand advances could be made at once using present knowledge.

7.2 A review was made of WHO's contribution to the development of basic health services in the six WHO Regions. It was found that similar projects in different countries had widely different stated aims and steps were taken to restructure them with the common objective of providing polyvalent services delivered to the entire population of each country. The purposes, functions, staffing and administrative patterns of health centres also vary widely from country to country and even in different contexts within the same country. A recent publication¹ clarifies the various meanings of the term "health centres", reviews the literature on the evaluation of health centre activities and offers suggestions for future studies.

7.3 *Development of health services.* In the last seven years, the number of WHO-assisted projects in health services development or related fields has increased from 85 to 172. In the African Region, for instance, the number of such projects was 15 in 1965 and 42 in 1972, in the Region of the Americas 28 and 54 respectively, and in the South-East Asia Region 13 and 33.

7.4 In the African Region in 1972, these projects were allocated more than a quarter of the Region's total budget from all sources for field activities and occupied more than a third of the staff for all projects. Efforts were made to provide integrated services combining activities in communicable disease control, medical care and maternal and child health with work in nutrition, environmental health and health education.

7.5 In the Region of the Americas the Organization assisted 54 projects for the development and extension of basic health services. In efforts to adapt health services to health needs, several countries attempted to coordinate or to integrate the institutional resources of the health sector with other national or community resources. This was especially evident in the urban and rural areas that had previously received fewer benefits. Countries in which this trend was noted particularly included Costa Rica, Ecuador, Uruguay and Venezuela. Barbados, Jamaica, and Trinidad and Tobago also introduced improvements in the administration systems of their ministries of health and Panama developed active community participation through numerous local "health committees". Brazil, Chile, Paraguay and Uruguay were among the countries that made efforts to expand health networks as part of intersectoral programmes for the socioeconomic development of their rural areas.

7.6 In the South-East Asia Region, where governments are displaying a growing interest in planning for health as a component of overall socioeconomic development, the emphasis remained on integrating curative and preventive services and merging specialized programmes into the basic health services. Unless the infrastructure is strong, health programmes cannot be maintained or sustained; hence an increasing acceptance of the need to train auxiliary health personnel, to convert single-purpose into multipurpose workers and to absorb the latter into the basic health services. In Indonesia, Sri Lanka, and various other countries of South-East Asia, high priority was given to collecting information on existing resources, conducting health manpower studies, preparing national health plans or master plans of operation for the strengthening of health services, and carrying out research in community health organization. Projects for health services development were allocated more than 16% of the total regular budget for regional field activities in 1972 as compared with about 12% in 1971. Nearly 25% of the WHO medical officers in the Region were assigned to such projects in 1972 as against about 18% in 1971; for all personnel, these figures were 21% and 14% respectively.

7.7 Arrangements were made to provide assistance to Bangladesh in establishing a health planning unit and

¹ Roemer, M.I. (1972) *Evaluation of community health centres*, Geneva, World Health Organization (*Public Health Papers*, No. 48).

in strengthening rural health services. Four senior health administrators were enabled to visit the USSR and India for three-week periods to see the organization of general health services in those two countries. In its annual plan, 1972-73, Bangladesh has given high priorities to the expansion of health services in rural areas, the development of a balanced programme of preventive and curative services, and the training of health personnel for medical services, particularly at the village level.

7.8 A WHO team visited Indonesia to review the programme for strengthening health services and exploring their development potential. A research element is included in the project. Another WHO team consisting of a malariologist and a public health administrator participated in Nepal with USAID, other aid agencies and the country's authorities in a malaria strategy review exercise. Recommendations were made for an integrated health services structure able to maintain the results already achieved in malaria control and to develop basic health services all over the country. For a start, activities will be confined to two pilot areas where malaria eradication has reached the consolidation phase.

7.9 In the Eastern Mediterranean Region many countries are endeavouring to consolidate existing public health services and to extend them further. Rather extensive basic health services projects are operating in Egypt, Iraq, Pakistan, the Syrian Arab Republic and Tunisia. The general aim in Ethiopia, Somalia, Yemen, and most other countries of the Region is gradually to develop networks of health centres and subcentres in selected provinces as the basis of an infrastructure of health services. These basic health services projects are receiving considerable assistance from UNICEF.

7.10 In the Western Pacific Region, WHO assisted the British Solomon Islands Protectorate, Laos, the Philippines, the Republic of Korea, Western Samoa and other countries and territories in the South Pacific in projects aimed at a more effective and economical delivery of health services, a wider population coverage, especially at the periphery, or a better coordination of health programmes, particularly in the field of family health. Many of these projects include facilities for the training of health staff and provide for health practice research with a view to improving the efficiency of health services in demonstration areas. In Malaysia, the operational studies on rural health services which began in 1968 were completed in June 1972. As a result, various alternatives are offered for increasing health services coverage and enabling rural health units to function more effectively.

7.11 In some countries of the European Region, the Organization is concerned with developing community health services related to the diagnosis and treatment of sickness and disability and the restoration of the individual to maximum functional capacity. The tendency in many countries of the Region is to reorient personal health services towards the community; this is reinforced by new social demands and priorities as consumers become more aware of their need for such services. Efforts were made in 1972 to collect information from Member States in the Region on the present trend in the organization of primary care services, and to obtain data on the utilization of existing services at different levels in one of the Republics of Yugoslavia (see paragraph 7.27).

7.12 A matter of growing concern to health administrations is the steady increase in the movement of populations. Whether it be by migrant labour or international tourism, millions of people are crossing frontiers every year. The social and economic repercussions are already being felt nearly everywhere. International bodies have important responsibilities in this respect and WHO is conducting two studies in the European Region, one on the health aspects of labour migration and the other on the public health aspects of tourism.

7.13 The interrelationships between health programmes and socioeconomic development were taken up at the Technical Discussions held at the Twenty-fifth World Health Assembly, in 1972. In the course of their deliberations, the 241 participants laid emphasis on the fact that economic development could not be isolated from the social context and that health programmes necessarily formed part of an interacting pattern of national programmes. Certain health consequences of unplanned socioeconomic development, urbanization, industrialization and pollution were already evident. If the interrelationships between socioeconomic development and health were not taken into account, material advances might be accompanied by loss of social cohesion, insecurity, delinquency, mental stress and other social ills. The proceedings are being published.¹

7.14 *Health services management.* Over the last few years, countries have shown an increasing tendency to look critically at the programming, planning, financing and management of their health services. In the Region of the Americas, for example, the Organization assisted or cooperated in 18 projects for improving the

¹ World Health Organization (1973) *Interrelationships between health programmes and socioeconomic development*, Geneva (Public Health Papers, No. 49).

administration and management of health services as one of the critical components of the overall development of national health service systems. Three of these were specific projects within countries, eight were components of a larger project, and seven were inter-country projects.

7.15 WHO has encouraged Member States to make use of the newer concepts and techniques that have been elaborated in health services management with a view to improving the efficiency of health services, taking due account of the level of development and sophistication of those services. The Organization has, however, drawn attention to the danger of using such tools without being sufficiently and properly prepared. The interest shown in these new ideas was illustrated by the choice of the subject "Organization, structure and functioning of the health services and modern methods of administrative management" for the Technical Discussions at the Twenty-sixth World Health Assembly.

7.16 *Health planning.* In WHO activities for training national staff, steps were taken to reorientate the teaching to include new methods and techniques and to adapt it to local conditions. Regional courses in national health planning were held at the Pan American Centre for Health Planning, Chile, for the Americas, in Thailand for South-East Asia, in Sweden and the USSR for Europe and in the Philippines for the Western Pacific Region.

7.17 Health planning, including manpower planning, has proved an essential tool for achieving more effective health services but studies and research are still needed to improve methods and techniques. A study in depth was initiated of certain specific aspects of the planning process, including the estimation of needs and demands for health services and the methods and techniques of evaluation. During the year progress was made in introducing the methods of project systems analysis when formulating country development projects. A *Public Health Paper*¹ was published with a view to providing national authorities with a representative selection of current approaches to health planning, and of different planning methods together with comments on the advantages and drawbacks of each.

7.18 In November a regional conference on national health planning was held in Manila. After a review of the current situation in the Western Pacific Region participants discussed national health planning as part

of development planning and reviewed different ways of undertaking national health planning in differing socioeconomic contexts. In June, a symposium on the methodology of health team manpower planning was held in Brazzaville during which the need for and importance of a team approach in health manpower planning were emphasized and methods of setting up, training and operating health teams were examined with particular reference to the situation in the African Region.

7.19 In the European Region, a study on developments in health planning within the framework of national development was undertaken. A working group on this subject, which was convened in Stockholm in June, reviewed the situation in most European countries and recommended methods for conducting pilot studies in health planning. Special attention was given to training in health planning at both the national and the international levels. Another working group, on the evaluation of public health programmes, was convened in Burgas, Bulgaria, in August. On the basis of the recommendations of these two groups, work was started to establish pilot areas for health planning and evaluation in different parts of the European Region. In this way, it will be possible to study the mechanism for short-, medium- and long-term planning of health services facilities, health manpower and programmes of disease prevention in countries with different public health structures. A survey was made of the present organization of health services in Luxembourg with a view to defining the priorities in public health problems and helping to set up a ten-year plan for the further development of the public health services.

7.20 *Medical care.* The supplement to the Fourth Report on the World Health Situation contains a review of a special topic, "Organization of Hospital Services", in addition to information on individual countries for the years 1969 and 1970. The supplement was discussed at the Twenty-fifth World Health Assembly, and a final version, incorporating amendments received from governments, is being prepared.

7.21 Many developing countries are in the process of drafting laws or regulations for their hospital systems and administrative rules for hospitals. To assist them in choosing the most suitable system for their requirements among the different patterns adopted in other countries, WHO has prepared a *Public Health Paper*¹ on hospital legislation and administration in²

¹ Hilleboe, H. E., Barkhuus, A. & Thomas, W. C., Jr. (1972) *Approaches to national health planning*, Geneva, World Health Organization (*Public Health Papers*, No. 46).

² Bridgman, R. F. & Roemer, M. I. (1973) *Hospital legislation and hospital systems*, Geneva, World Health Organization (in press).

the world. It is based on a questionnaire which many Member States answered in a very complete manner.

7.22 In the field of medical care, WHO assisted countries to strengthen hospital administration through better utilization of human, financial and material resources, to improve hospital design and management, to review medical records systems, to establish medical specialties in general hospitals and to build up medical rehabilitation services. In the Region of the Americas assistance was provided in expanding, remodelling, constructing and equipping hospitals. In the six teaching hospitals participating in the progressive patient care programme which is assisted by the W. K. Kellogg Foundation, ambulatory studies were carried out to review the care given at outpatient services and the utilization of these resources in training health personnel. In five large hospitals, a beginning was made in applying the principle of service unit management which seeks to achieve better patient care by freeing doctors and nurses from nonclinical activities. Assistance was also given in planning and implementing intensive care units as a part of progressive patient care programmes. The preparation of leaders in the field of hospital maintenance is essential if the cost/benefit ratio is to be improved and the maintenance system capable of ensuring the operational readiness of medical equipment. Efforts were made in the Region of the Americas to stimulate ministries of health, labour and education to work together to improve hospital maintenance and engineering.

7.23 In the European Region, a study was undertaken on the influence of functional changes on hospital design and operation. A symposium on the evaluation of the efficiency of medical care was held in Brussels in November, following a symposium on the same subject in 1966 and a study made in 1970 and 1971. It was attended by specialists from Austria, Belgium, Denmark, Hungary, Ireland, Norway, Portugal, Sweden and Switzerland, and the principal question discussed was how the general methods and principles of evaluation could be applied to medical care services.

7.24 *Medical rehabilitation services.* Continuing its efforts for the development of medical rehabilitation services and the training of various categories of personnel for those services, WHO provided assistance in 1972 in physical medicine, physiotherapy, occupational therapy, and prosthetic and orthotic services in Chile, Egypt, India, Iran, Jordan, Laos, Lebanon, Pakistan, Sri Lanka, Thailand, Venezuela and Zaire.

7.25 In connexion with the African regional project in medical rehabilitation a WHO team visited Guinea,

Liberia, Malawi, Nigeria, Senegal, Uganda and Zaire to study the status of medical rehabilitation services and assist in planning and organizing such services.

7.26 An interregional seminar on the planning, organization and administration of medical rehabilitation services was held in New Delhi in September and two interregional courses were held with DANIDA support in Holte, Denmark (see Chapter 10).

7.27 *Research.* The number of research projects in community health services has become fewer, but the financial and technical support for key projects has increased. At the same time there has been a greater national commitment in research projects and both provincial authorities and academic bodies have become increasingly involved in them. Among the research projects begun in 1972 is a study of the regional organization of health services and health insurance in the Serbian Socialist Republic of the Yugoslav Federation. Its purpose is to collect data on the provision and utilization of health services in Serbia and to propose guidelines for regrouping health services and health insurance offices more effectively so that supply matches demand more closely and inequalities in the funds available in different geographical areas are reduced. Elements of the project on which work is in progress include a demand and utilization study among a sample of 13 000 Serbians over a one-year period; a study of services provided in one district of the country, the results of which will be standardized by comparison with the representative picture emerging from the demand and utilization study; an economic analysis of the income and expenditure of health services; and the establishment of a mathematical model to take into account the effects of possible changes in a number of key variables influencing the performance of health services. A research project in health services development in Iran is described in paragraph 12.13.

Health laboratory services

7.28 The Twenty-fifth World Health Assembly in resolution WHA25.47 requested the Director-General to study the means of extending the work of WHO in the development of standards for chemical and biological diagnostic materials and related aspects of laboratory methods and the coordination of research in this field, and to report thereon to a future Health Assembly, including an estimate of the costs of such activity. As a consequence, the Center for Disease Control in Atlanta, Ga., USA, and WHO have made preparations to hold a four-day international conference on the standardization of diagnostic materials

in 1973. The main topics to be considered are basic principles for the acceptability of diagnostic materials as standards and problems of standardization in clinical chemistry, haematology and microbiology.

7.29 Particular efforts have been made to ensure better coordination between international research workers and WHO in the fields of standardization and quality control, and to promote further research, especially with respect to laboratory methods in haematology and clinical chemistry. This was pursued by WHO in the course of its participation in two international congresses—one on clinical chemistry held in Copenhagen in June, the other on haematology in São Paulo, Brazil, in July.

7.30 The Organization, with the assistance of international experts, is developing a programme of research on the possible applications in health laboratories of automation techniques and new and improved rapid methods in the field of microbiology. The possibility that such methods and techniques may have a practical application in the diagnosis of communicable diseases and the control of environmental pollution has been demonstrated in recent studies for the quick detection of live particles in the air. This new WHO programme will thus have a bearing on activities in both public health laboratories and hospital laboratories.

7.31 To provide advice to developing countries on the introduction in health laboratories of complex modern equipment and data processing facilities for clinical chemistry and haematology, WHO undertook a study on the subject which shows that the problems of training staff in the use of such equipment, of repairing and maintaining it and of meeting its high cost have not all been solved. The study stressed that countries should make a careful cost/benefit evaluation before deciding to introduce equipment of this kind. Assistance was provided to Iraq and Sudan on the application of the findings of the study to the actual needs of the health laboratory services in those two countries.

7.32 Special projects to strengthen health laboratory services were assisted by WHO in Algeria, Burundi, Khmer Republic, Laos, the Republic of Viet-Nam and other countries in most WHO Regions. Laboratory equipment was supplied to general health laboratories in four countries of the South-East Asia Region and four in the Western Pacific Region. The improvement of laboratory services in support of national activities for the epidemiological surveillance of communicable diseases was particularly encouraged by the Organization. Advice on vaccine production

and control was provided for a large number of countries, and Albania, Bangladesh, Brazil, Colombia and India were supplied with equipment for this purpose.

7.33 WHO provided technical assistance to several long-term projects supported by UNDP in one or more of the following main areas: modernizing and improving national laboratories, control and production of vaccines and other biological substances, services for the diagnosis of communicable diseases, production of laboratory reagents, and training national staff. Programmes of this kind have already been approved by UNDP for Chile, Cuba, Egypt, Mexico, Sudan and Venezuela and are under consideration for Ethiopia, India and Tunisia.

7.34 The collaborative study on the standardization and quality control of glucose and urea determination in blood that was started in 1971 in cooperation with the Center for Disease Control in Atlanta was extended to 14 more laboratories, bringing the total number of laboratories participating in all Regions to 41.

7.35 Training of laboratory staff still has first priority in regional health laboratory programmes (see also Chapter 10). While, due to the continuing prevalence of communicable diseases, microbiology and vaccine production and control continue to be the main subjects, there has been a tendency to expand training in other laboratory fields such as clinical chemistry, haematology and blood transfusion, in view of their growing importance for noncommunicable diseases. Special training in connexion with cholera was given to laboratory workers in many countries that may be threatened with epidemics. Assistance in the production of rehydration fluid has been given both in the form of advice for the production centres and by providing equipment. In the South-East Asia Region, an intercountry course on the laboratory diagnosis of smallpox was held to support national eradication programmes. A seminar on health laboratory services, organized in Manila in December, brought together specialists in charge of laboratory services in countries in the Western Pacific Region. Intercountry collaboration was strengthened and a discussion held on activities in the long-term intercountry programme in health laboratory services initiated in that Region.

7.36 The WHO International Blood Group Reference Laboratory in London gave technical advice to national centres on the organization and development of blood transfusion services and provided guidance to several countries in the African Region. It also

supplied blood typing sera to several countries. The International Panel of Donors of Rare Blood Types, which is organized by the WHO Reference Laboratory, expanded its services and now includes most of the rare blood groups. The donors are registered with the major blood transfusion centres in a large number of countries, and the blood is available at short notice on a worldwide basis.

7.37 The International Committee on Laboratory Animals, which is supported by WHO, continued to promote the development of animal laboratory science through fellowships, advice and reference activities; it also sponsored research in this field.

Nursing and midwifery services

7.38 WHO assistance to the development of nursing and midwifery services is generally provided within the framework of more comprehensive, integrated programmes for the strengthening of health services. In most Regions the public health nurses provided by WHO are thus increasingly becoming members of multidisciplinary teams at both national and regional levels.

7.39 In activities for the strengthening of health services, WHO assistance in nursing and midwifery was provided in over 100 projects in 60 countries or territories. These represent about half of all the WHO-assisted projects with a nursing and midwifery element and are exclusive of projects that are primarily concerned with the development of nursing and midwifery education but often have a nursing service component; these last are dealt with in Chapter 10.

7.40 Of the more than 100 projects mentioned above, over 80 were at the country level, more than 20 at the intercountry level, and several at the inter-regional level. Over half of them were comprehensive projects for the development of basic health services; some 20% dealt specifically with maternal and child care, including family planning; about 10% with communicable disease control, particularly tuberculosis control; three with mental health, and the remainder with nursing administration as such. For this group of projects, WHO provided, mostly on long-term assignments, some 150 nurses, nurse-midwives or midwives, or nearly half the total of all the nursing personnel provided by the Organization. The remainder were mainly engaged in nursing education activities (see Chapter 10); it should be pointed out that there is also considerable emphasis on educational aspects in the projects under review in the present chapter.

7.41 The main concern of WHO nurses and midwives is the development of policies, standards, procedures and evaluation criteria related to the development and improvement of the relevant services in terms of both quantity and quality. A primary objective is to assist national nurses and midwives in senior administrative positions to define and assume their role in decision-making so far as the nursing and midwifery component of national health plans is concerned, including the distribution and utilization of the appropriate personnel. In few countries, however, have senior nursing administrators been granted either the authority to exercise such a role or an opportunity to prepare themselves for it. Nevertheless, some progress has been made in this respect. In Nigeria, for example, where WHO assistance has been provided for strengthening nursing services, a Nigerian nurse is one of the six members of the newly created planning unit in the Ministry of Health. In the Americas, as a follow-up to a seminar in 1971 that dealt with the programming of nursing care in health services, activities were initiated in Colombia, Costa Rica, El Salvador, and Guatemala to formulate both a policy for the development of nursing over a 10-year period and a plan to meet the anticipated needs. In a regional project on standards of nursing care, a task force of nurses has been given the responsibility of selecting the areas for which standards are most needed, developing the methods to be used in establishing standards, and defining the basic information required.

7.42 Two WHO documents were used extensively by those responsible for improving nursing administration. They are: one of the *Public Health Papers* series entitled *Planning and programming for nursing services*¹ which is now available in French and Spanish as well as in English; and the report of the interregional seminar on the application of the planning process to nursing held in Washington, D.C., in 1971. The former outlines the major steps of the planning process in relation to nursing; the latter (an unpublished document available on request) defines the role and functions of nurses and midwives in senior administrative positions.

7.43 One of the major elements in nursing and midwifery services is the further preparation of existing staff through in-service training and supervision. In one WHO-assisted project in India, for example, 50 staff nurses in a large hospital were given on-the-job orientation courses, and a group of ward-sisters undertook a study of the collection and delivery

¹ World Health Organization (1971) *Planning and programming for nursing services*, Geneva (*Public Health Papers*, No. 44).

of laboratory specimens to determine how nurses might be relieved of certain non-nursing duties. However, while in-service training is practised in most WHO-assisted projects, it is usually provided on an *ad hoc* basis and only for certain categories of nursing personnel in certain areas of health care. There is a need to design systems for in-service training, field training and supervision for nursing and midwifery staff in all clinical and functional areas.

7.44 Manuals of nursing care constitute an important component of supervision. Assistance was given to Afghanistan in preparing a manual on general nursing techniques; to India for one on intensive-care nursing and another on paediatric surgical nursing; to Indonesia for one on the work of nursing and midwifery personnel in the areas of public health nursing, family planning, and mental health; to Morocco for one on nursing in tuberculosis control programmes and another on health education for nurses and midwives; and to the Philippines for one on public health nursing and another on the supervision of nursing personnel in rural areas.

7.45 Assistance in health practice research was given to a number of countries in all Regions with a view to more effective and efficient planning and management of nursing and midwifery services. In

the African Region, nurses took part in the preparation of a report on an operational study in Kenya directed to reorganizing the activities of health personnel in peripheral health units. In the European Region, work continued on the study of nursing resources. Assistance was given in surveys of nursing studies conducted in independent settings or within the context of health services research in eight countries. In Switzerland, an experimental programme, based on the recommendations that emerged from an earlier study of the functions of nursing personnel¹ and a more recent pilot study of patients' dependence on nursing, was started in a number of wards in five hospitals. In the South-East Asia Region, assistance was given to Indonesia in preparing a manual for use in conducting studies on the activity of midwives and in instructing national and WHO staff in the principles of operations research and systems analysis as a basis for developing plans of action. In Sri Lanka, a study of the activities of public health nurses and midwives working in rural areas was included as part of a health manpower study. In the Western Pacific Region, WHO nursing personnel took part in operational research activities in Malaysia and in studies of the activity of nurses, midwives and other health workers in Laos, the Philippines and the South Pacific.

¹ See *Off. Rec. Wld Hlth Org.*, 1971, No. 188, p. 151.

8. HEALTH STATISTICS

8.1 The new trends in medical care, and the present reorientation of WHO's work—emphasizing such aspects as the planning and evaluation of national health programmes, the interaction between health, population dynamics and socioeconomic development, the improvement of family health by complementing the traditional concern for the individual by a family-oriented approach, and action for the protection of the environment—must, of necessity, be reflected in an adaptation of the health statistical information system to the new requirements and the demand for more accurate and more detailed data. There has been a gradual change from the routine collection of statistics, treating individual components in a more or less isolated way, to an integrated approach to the collection, analysis and dissemination of data.

Development of health statistical services

8.2 To help ascertain the main problems preventing the optimum development of national health statistical services, a methodology for evaluation—including assessment of training curricula and of the organization and effectiveness of existing systems—was developed during 1972 and tested in pilot studies preparatory to large-scale use in 1973. Since the inadequate standard of services in many countries is largely due to lack of qualified statisticians or inadequate statistical training of health personnel, WHO continued to give particular attention to the promotion of training in health statistics and medical records (see Chapter 10). In all, more than 60 WHO-assisted projects were in operation during the year for the development of national vital and health statistical services.

8.3 WHO's role with regard to health manpower statistics was considered during a consultation in October. It was felt that a cross-sectional approach should be adopted, the statistics covering such aspects as the health worker's education and specialized training, professional duties and status, as well as demographic, sociological and other data on the population, including their requirements with regard to medical services. Stress was laid on the need for a critical analysis of the accuracy and completeness of data; the essential role of statistics as a basis for determining the type of specialized training of health

workers that is best adapted to prevailing needs, as well as the interrelationship between population trends and health manpower requirements; and the importance of taking into consideration the implications of overall health policies, and of changes in those policies. It was suggested that countries might benefit from help for the establishment of national registers containing data relevant to the various aspects of health manpower planning and requirements.

8.4 The growing awareness of the need for accurate and reliable statistical information as a basis for health planning was illustrated by the increase in the number of requests in the South-East Asia Region for advice and assistance in this respect. For example, assistance was provided to Sri Lanka in connexion with a comprehensive health manpower study (see also paragraph 10.53) and to Thailand with regard to health planning and the evaluation of health programmes. In Indonesia WHO assisted in the establishment of a central data processing unit and the development of simplified procedures for hospital reporting. The results of a three-month trial of a proposed new reporting system were analysed with a view to the system being adapted for use by all hospitals in the country.

8.5 In the same Region the use of health data for socioeconomic development is receiving much attention, and considerable work was done on the collection of the basic statistical information required for the definition of health targets. In the European Region, in line with the establishment in many countries of a common authority to administer both public health and social services, the possibilities are being explored of integrating health statistics with socioeconomic data. As part of a joint ECE/WHO project, a study was made of statistical services in selected countries in the Region, and a joint working group met in Geneva in December to review the information obtained.

8.6 Considerable emphasis was laid on the development of statistics in support of epidemiological services in the African Region (for example, in Nigeria, Sierra Leone, Uganda, United Republic of Tanzania, and Zaire), and in the Western Pacific Region, where WHO is providing statistical assistance

within epidemiological projects in the Khmer Republic, Malaysia and the Republic of Korea. In the European Region, attention has now been turned to the possibility of identifying individuals and population groups with a high risk of developing disease or disability, for the purpose of surveillance, preventive action and early treatment; existing and potential methods of identifying susceptible individuals and groups were reviewed during a symposium held in Windsor, United Kingdom, in May.

8.7 In the Eastern Mediterranean Region WHO assisted projects for the improvement of health statistical services in Afghanistan, Egypt, Ethiopia, Sudan and Tunisia. It also assisted with training in health statistics, medical records science and computer technology.

8.8 Means of improving assistance to countries in the processing of health statistics were discussed during a consultation held in March. There was considered to be a need for feasibility missions to be sent to selected countries to investigate ways of improving existing services and to assess the need for external aid. With regard to national health statistics offices, it was felt that, in addition to strengthening the assistance already being provided, WHO should encourage communication between offices in developed and developing countries and provide special help to selected statistics offices that could act as demonstration and development centres for neighbouring countries. It was suggested that intercountry centres be established for the purpose of supporting government offices in the collection and processing of data and the training of personnel.

8.9 In the Region of the Americas the regional advisory committee on computers formulated guidelines for countries wishing to use computers in processing statistical data on morbidity and mortality. The UNDP-assisted computer centre in Argentina, which also receives support from the Organization, held its first international course on health information systems, as well as a number of national courses on various aspects of the use of computers. The Organization also provided advice in this connexion to Cuba, El Salvador and Venezuela.

Dissemination of statistical information

8.10 The Organization continued to compile statistical information collected from Member States. A procedure was worked out to broaden the scope of the health manpower statistics to be integrated into the electronic data processing system, with particular

attention to those obtained in the 1970-71 population censuses. WHO also established contact with other members of the United Nations system with a view to supplementing the information stored in its data banks, so as to bring together all health-related statistical information.

8.11 Consideration was given to ways of improving the timeliness of publications. In this connexion, the use of the computer for data processing considerably facilitated the preparation of the *World Health Statistics Annual*, containing statistics on morbidity, mortality and health manpower. Statistics on the following subjects of current interest and public health importance were published in various issues of the *World Health Statistics Report* during 1972: major causes of death, 1955 to 1968; expectation of life, 1958 and 1968; sources of medico-social information on the elderly; medical personnel in hospitals; availability of statistical information on accidents; poliomyelitis morbidity, 1961 to 1970.

8.12 WHO's role in the monitoring of congenital malformations in order to be able to recognize, as early as possible, environmental agents that might be hazardous to prenatal development was considered during a consultation held in July. It was suggested that a collaborative reporting system be started, involving, initially, countries and centres already collecting suitable data. The technical guidance and other forms of assistance that might be provided, including help in setting up data processing facilities, for countries wishing to set up systems for registering or monitoring congenital malformations were also discussed.

Health statistical methodology

8.13 The proper conduct of public health field studies demands clarity of concept and scientific rigour in their design. The underlying principles are broadly statistical, and statistical methods are needed to analyse the data collected. However, descriptions of the statistical principles applied in such field studies are still inadequately defined; moreover, they are scattered through the literature and known only to experienced workers. The WHO Expert Committee on Health Statistics, at its meeting in March, therefore recommended the preparation of manuals on sampling and on certain special statistical problems. It also recommended the encouragement of research on statistical principles and methods for public health field studies and further exploration of the statistical aspects and practical utility of mathematical models in the planning and administration of health services.¹

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510.

8.14 Statistical support was continued for a variety of WHO-assisted projects, at all stages from planning to analysis of the findings. Mention might be made of the following projects in communicable diseases: a study of schistosomiasis in Cameroon, Gabon and Nigeria; tuberculosis prevention trials in India; a tuberculosis chemotherapy trial of rifampicin in Poland; surveys of the prevalence of treponematoses in Niger, Senegal and Upper Volta; studies on communicable eye diseases, including trachoma, in Algeria, Burma, Libyan Arab Republic, Sudan and the United Arab Emirates; and serological surveys of malaria in Kenya and Tunisia. Statistical assistance was also given to a number of projects concerned with nutrition, dental health, mental health, cardiovascular diseases, cancer, immunology, biological standardization, and vector biology and control.

8.15 Increased attention is being given to statistical techniques in various fields concerned with the organization of health services, examples being a project of research on the regional organization of health services in Yugoslavia (see paragraph 7.27), and a study on the migration of medical personnel.

8.16 Work was continued on the development of epidemiological models, by means of computer simulation, for tetanus (see paragraph 1.190), leprosy and cerebrospinal meningitis.

8.17 The application of medical computing in public health was discussed during a consultation in June, when ways in which WHO might assist Member States in this field were considered. Particular stress was laid on the importance of standardizing the recording of health information for computer processing. Following this and an earlier consultation (1971) on computer applications in medical care, initial contact has been established with centres concerned with computing in medicine, hospitals and public health with a view to forming a network facilitating the exchange and dissemination of information on technology.

Population dynamics

8.18 The increasing emphasis on the statistical aspects of population dynamics continued during 1972, many of WHO's activities in this field being carried out with the support of UNFPA. Cooperation with the United Nations regarding the health aspects of population dynamics was also strengthened, the wide range of joint activities during 1972 including preparations for the 1974 World Population Conference.

8.19 The recent development of family planning programmes in many countries of the world has given rise to the need for a periodic publication of statistics on family planning programmes on an international basis. As a first step towards the preparation of such a publication, a review was made during 1972 of the information available. A plan of operation was also drawn up for a comparative study of the methodology and techniques used for the collection and analysis of data for the planning, operation and evaluation of family planning programmes.

8.20 The statistical evaluation of the impact of family planning on health was the subject of a consultation in October, when the main requirements for statistical information in this field were defined, guidelines were formulated for the collection and analysis of relevant data, and suggestions were made regarding future work in this field.

8.21 There was a marked trend towards greater emphasis on population dynamics and family health in the South-East Asia Region; it may be illustrated by projects in Indonesia and Sri Lanka. In the former country, the Government received assistance in compiling the essential data required for the conduct of a national family health programme; in Sri Lanka, WHO statistical assistance was furnished within a UNFPA-funded project for the promotion of family health through the general health services.

8.22 Emphasis was given to training in statistical methods for national family planning programmes. Mention may be made of the workshops for health statisticians held in Teheran, Bogotá and Bangkok. Work was also continued on the preparation of manuals on statistical techniques for health demography research.

8.23 Although the perinatal period occupies less than 0.5% of the average life span, in many countries the number of deaths during this period exceeds the total occurring during the subsequent 30 years of life. Increasing attention is being focused on this problem in the developed countries, where infant and child mortality have been reduced. In view of the general lack of information on the influence of various biological, socioeconomic and cultural factors on perinatal mortality, the Organization has started a comparative study, initially in six countries (Austria, Cuba, Hungary, Japan, New Zealand, USA). The aim is to compare perinatal data from countries with different social, economic and administrative systems, taking into consideration demographic and social factors (including maternal age, birth order and birth interval, parental occupation and education) and

biological data (such as birth weight and gestational age), in order to identify "high risk" groups. The study should serve to promote collaboration between obstetricians, paediatricians and health statisticians at both national and international levels, to further international agreement on existing definitions and improve data collection, and to stimulate improvements in the reporting, collection, processing and analysis of data. It is hoped that, as a result of the study, it will be possible to recommend a standard set of data on births and perinatal deaths that might be collected by other countries.

8.24 Preparations were made for *ad hoc* surveys to be carried out in a number of countries on fetal, infant and early childhood mortality and on fertility patterns, and work was started on one such survey, in Afghanistan.

8.25 In the Region of the Americas the Organization provided assistance for the continuation of a demographic survey in Honduras. The improvement of civil registration also received attention; it was the subject of a seminar held in Brazil, and a pilot study on civil registration was begun in Mexico.

8.26 With regard to mortality statistics, the United Nations and WHO sponsored an interregional seminar in Mamaia, Romania, during September and October, to assist developing countries in reviewing mortality trends. The participants, from 23 countries, discussed recent developments in methodology for the collection and analysis of mortality data. In the Region of the Americas, data obtained in the inter-American investigation of mortality were processed and analysed in preparation for publication; and in the European Region the study on medical certification of causes of death, in which several countries have participated, was completed, and the final report was prepared. An expert group meeting on mortality jointly sponsored by WHO and the United Nations Economic and Social Office in Beirut (UNESOB) was held in that city in December to discuss data on mortality trends in the Eastern Mediterranean Region.

International Classification of Diseases

8.27 By the end of 1972, which was the closing date for the submission of proposals for the ninth revision of the International Classification of Diseases, a large amount of material had been received and collated for consideration by a study group that is to meet early in 1973 to prepare a draft for circulation to Member States. The material, ranging from proposals for whole sections to isolated comments on individual

categories, came from a variety of sources, including international reference centres (both those for the classification of diseases and those in other special fields), as well as individuals and countries.

8.28 At a meeting held in Caracas in March the heads of the four WHO International Reference Centres for the Classification of Diseases reviewed a number of preliminary proposals for various chapters of the Classification. They recommended the introduction of double coding to identify both elements in cases where a single diagnostic statement contained two elements of information (for example, "diabetic cataract"), so that records could be retrieved according to either element (that is, all diabetes cases, or all cataract cases).

8.29 A working group met twice to reconcile different approaches to the problem of classification of neoplasms. The International Classification of Diseases classifies malignant, benign and unspecified types of neoplasms in separate sections, whereas the International Agency for Research on Cancer has proposed a topographical classification for all types of neoplasm, to be used in conjunction with a histopathology/behaviour code that would distinguish between malignant, benign, *in situ*, etc. On the basis of the Agency's proposal the working group established an oncological adaptation of the Classification for use by cancer registries and cancer research agencies, so that material coded according to this system can be regrouped according to the categories of the Classification.

8.30 Proposed revised classifications of psychiatric and neurological disorders were prepared during the eighth seminar on the standardization of psychiatric diagnosis, classification and statistics (see paragraphs 4.96-4.97).

8.31 Several meetings were held at the regional level to give countries an opportunity to formulate consolidated proposals for the ninth revision of the Classification. In the European Region a meeting was held in Paris in April for countries using the French-language version of the Classification (or using it as a basis for a version in their own national language), and one in Moscow in November for users of the Russian-language version. In the Region of the Americas, a Latin American study group was held in Lima in August, for Spanish-speaking countries. Similar meetings for countries in the Western Pacific and South-East Asia Regions were held in Manila in October and in New Delhi in November.

8.32 There has been an increase in the demand for volumes of the Classification and for instruction in

its use in the Region of the Americas, and a manual in Spanish was issued on the use of the Classification in hospitals.

8.33 With UNFPA support, two consultations were held to consider various aspects of the methodology for reporting and analysing data on maternal and perinatal mortality and morbidity. During the first, held in Geneva in April, final adjustments were made to proposals drawn up in 1971 for new definitions regarding the perinatal period and for methods of calculating rates and ratios. Viability criteria at birth and international variations in the interpretation of signs of life were also discussed. At the second consultation, held in Bristol, United Kingdom, in September, a terminology and methodology for the collection of perinatal mortality statistics were adopted, and the terms used to describe birth weight in relation

to gestational age were defined. A review was also made of the progress achieved in the field testing of the draft international certificate of cause of perinatal death which has been started in a number of countries, including Australia, Canada, Cuba, Czechoslovakia, France, New Zealand, and the United Kingdom. Proposals for the chapters of the Classification relating to maternal and perinatal morbidity and mortality were finalized.

8.34 A project on the registration of pregnancies and their outcome was started in three countries, and a preliminary evaluation was made of the results so far obtained, with a view to the project being extended to further countries. In addition, a study was started on the collection of maternal and infantile health statistical data in countries where there is a dearth of qualified medical personnel.

9. FAMILY HEALTH

9.1 A concern with the quality of life is implicit in the grouping in the Organization's family health programme of its activities in maternal and child health, nutrition, health education and human reproduction. These are activities that concern crucial factors in the life of the family and the individual or that bring about more informed participation by the family in measures to improve its health and that of the community of which it forms a part. Since the family health programme was instituted in 1970, the numbers of requests by governments for assistance with family health activities have steadily grown, reflecting a clearer awareness of the complexity of physical and mental ill-health and its association—which is particularly strong in early childhood—with such social conditions as poverty, lack of education, overcrowding, bad housing, poor environmental hygiene, and rapid population growth.

9.2 The family health programme is intended to help governments in the solution of at least a part of this complex problem. It does so either by the provision of services or advice within each of the areas detailed in this chapter, or, where circumstances permit, by assistance with projects covering a much wider range; some idea of the number and breadth of the latter is given in paragraphs 9.7-9.12. The programme is therefore closely interwoven with, for instance, those for strengthening health services, for developing adequate resources of health manpower, and for collecting indispensable statistical data on events affecting the health of the family.

9.3 There is a vital need to train personnel for family health programmes; the work being done to this end is outlined in Chapter 10. It may be noted here, however, that the introduction of family planning activities is a relatively new departure for health services, which generally lack the requisite trained staff. Priority is therefore being given at this stage to the training of teachers, supervisors and administrative leaders; and, wherever possible, to the introduction of integrated teaching programmes on the health aspects of family planning, human reproduction and population dynamics into the basic curricula of health personnel at all levels.

9.4 In many developing countries the traditional health structures require considerable modification to

meet the challenge to the health services that this new departure represents. Some stress is therefore being laid by WHO on operational research into better methods of organization and administration, and national health administrations are taking an increasing interest in the application of such research to the solution of the problems met in trying to integrate family health and family planning activities into the general health services. In 1972 WHO helped to develop operational research studies of this type in several countries, including Iran, Kenya and Tunisia.

9.5 It is essential for the effective delivery of family health services at the national level that there be the closest possible coordination between WHO and the numerous other organizations with related interests. In relation to the programmes in maternal and child health, nutrition, and health education, such coordination was continued and extended during the year with the other organizations within the United Nations system, such as FAO, UNESCO, UNICEF and the World Food Programme; with the International Children's Centre; and with nongovernmental organizations such as the International Union for Health Education, the International Federation of Gynecology and Obstetrics, the International Paediatric Association, and the International Union of Nutritional Sciences; as well as with a number of bilateral assistance and voluntary organizations. For the development of specific aspects of the programme related to the health aspects of family planning, human reproduction and population dynamics, there was extensive coordination and consultation not only with the above-mentioned bodies, but also with UNFPA, the Population Division of the United Nations and the four regional economic commissions and UNESOB; with IBRD; and with nongovernmental organizations such as the International Planned Parenthood Federation and the Population Council and sources of bilateral assistance and voluntary and private bodies such as the Ford Foundation. In addition, WHO has been actively participating in the preparations for World Population Year (1974) and the World Population Conference to be held in 1974 under the auspices of the United Nations.

Maternal and child health

9.6 In some 70 countries where WHO is assisting maternal and child health programmes, the primary objective is to ensure that basic services, such as those for maternal care, child care (including immunization and simple treatment of children), health education (including nutrition education), and family planning, are made more rapidly and widely available to mothers, children and families. The type and scope of assistance rendered vary from country to country, depending upon the needs of the population, the stage of development of the health services, and government policy.

9.7 In 25 countries of the African Region, assistance in the field of maternal and child health is rendered within the projects for the development of basic health services; 17 of these projects make particular provision for specialized maternal and child health staff.

9.8 In the Region of the Americas, an urgent goal of most maternal and child health programmes is the reduction of high maternal and child mortality and morbidity rates, through improved provision of health care. With assistance from the Organization, nine countries in this Region are implementing integrated maternal and child health/family welfare programmes, ranging from the strengthening of services at large maternity institutions to extension of services to rural areas. An evaluation of Colombia's programme of rural extension of maternal and child health and family welfare services showed 518 clinics with a total of over 152 000 persons being served, of whom nearly 55 000 joined the programme during 1972.

9.9 In the Eastern Mediterranean Region, several countries surveyed their needs and possibilities for expanding and strengthening maternal and child health care, with WHO assistance. In Democratic Yemen, Pakistan and Sudan, attention was given to developing maternal and child health services and improving the delivery of midwifery services under the maternity-centred family planning programme; in Afghanistan and Ethiopia, integration of maternal and child care into basic health services was the focus of attention. Assistance was provided to the Libyan Arab Republic and the Syrian Arab Republic in developing and improving their school health services.

9.10 In the European Region, a critical study and evaluation of maternal and child health services in some countries was made, a questionnaire adapted for computer analysis being used. Analysis of the

data received has shown that a certain reorientation of the functions of maternal and child health services would be useful. Assistance in the development of maternal and child health services was provided during the year to Algeria, Morocco and Turkey.

9.11 In the South-East Asia Region, the Organization assisted country programmes for strengthening the basic health services in support of family health activities, through maternal and child health care, in India, Indonesia, Nepal, Sri Lanka, and Thailand; a special effort was made for the development of maternal and child health programmes as part of assistance to health services development in Bangladesh. A programme in Mongolia, receiving support from WHO and UNICEF, is concerned with strengthening the administration and operation of maternal and child health services at all levels in the country, including the reorganization and improvement of the institutional care of mothers and children. In Sri Lanka, the Organization helped in the development of a programme for strengthening the infrastructure of health services to provide for the delivery of family health care through expansion of the existing maternal and child health programme in the peripheral clinics; a system of referral services to district base hospitals and provincial hospitals will gradually be developed.

9.12 In several countries and territories of the Western Pacific Region, maternal and child health programmes assisted by WHO focus especially on the need to expand health services to reach families in the peripheral areas where there has traditionally been a shortage of health manpower and other resources; examples of these are the family welfare projects in Laos, the Philippines, Tonga, and the Gilbert and Ellice Islands. Assistance was provided to seven other countries or territories in formulating and planning maternal and child health programmes as part of comprehensive, multidisciplinary projects.

9.13 The family planning aspects of family health were one of the main subjects discussed in February by the nineteenth session of the UNICEF/WHO Joint Committee on Health Policy (see also paragraph 13.23). The Committee considered a report reviewing existing maternal and child health and family planning programmes that have received assistance from UNICEF and WHO and approved a number of specific recommendations for future assistance in the planning, evaluation, organization and administration of services, in education and training, and for operational studies.¹

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 203, pp. 21-28.

9.14 Many countries now accord priority to family planning as an integral part of family health—particularly of maternal and child care—and WHO responded during the year to requests from over 40 countries or territories for assistance in the *family planning aspects of maternal and child health* within its maternity-centred family planning programme. The final aim of this programme is to improve the health of the family. To this end it emphasizes the provision of qualified maternal and child health care, including prenatal care and assistance during delivery; care of the newborn, infant and child; educational counselling; nutritional advice, and immunization; along with the provision of care for fertility regulation, including infertility. In this approach, all contacts of the health services with families—throughout the maternity cycle, child care, home visiting, etc.—may be utilized for provision of integrated primary maternal and child care, including family planning advice and services.

9.15 This maternity-centred family planning approach has been developed by WHO since 1970, when three main areas for action were outlined:

- (i) An operational programme, designed to improve the obstetrical, gynaecological and paediatric services of major hospitals in urban areas where hospital-based family planning services would also be provided;
- (ii) Field studies and pilot projects to explore the extension of maternity-centred family planning activities to small units and rural areas;
- (iii) Activities concerned with education and training and the collection of data on the health benefits of family planning.

9.16 WHO assistance in these fields has been provided at government request, in collaboration with other United Nations bodies, particularly UNFPA, UNICEF and IBRD, and with bilateral and private agencies or organizations such as USAID, the Population Council and the International Planned Parenthood Federation. It will be convenient to describe activities in this field in 1972 with reference to these three areas of action.

9.17 The Organization assisted more than 20 countries or territories in planning and implementing programmes for the strengthening of maternal and child health/family planning services in *major hospitals*; this help included the improvement and expansion of facilities, the provision of training for all levels of staff, and the establishment of improved systems of referral and follow-up by maternal and child health clinics. Altogether, nearly 100 hospitals were actively involved,

and if present country plans come to fruition three times that number will adopt similar programmes within the next two years. The programme in the Philippines is one of the most advanced; having moved into the second phase of its development, it now comprises 15 hospitals. In Costa Rica the Social Security Administration extended the maternity-centred programme to six hospitals and eight health posts during the year. Other countries where a hospital-based maternity-centred family planning programme is well established include Chile, Ecuador, Egypt, Indonesia, Iran, Pakistan, and Thailand. In most cases the programmes are being developed initially in teaching and training hospitals—for instance, in Algeria, Iraq and Sri Lanka—which will serve in the future as pilot demonstration and training centres for national family health programmes.

9.18 Programmes emphasizing the extension of maternity-centred family planning activities to *smaller units and rural areas* were being developed with WHO assistance in India, Western Samoa, the Gilbert and Ellice Islands and Tonga and were at the planning stage in several other countries. In these programmes clinic facilities, supplies, equipment and transport to outlying areas are being improved, and, where possible, the number of clinics may be increased to achieve better coverage of the population; better systems of supervision are being planned to permit optimum use of available medical and auxiliary personnel; family health education programmes are begun and the help of community groups is solicited; improved registration of vital statistics is also being promoted. All levels of staff, but especially nurses and midwives, receive training, largely through one centre selected by each country or territory to develop national training programmes and conduct pilot demonstrations and research.

9.19 The need for field studies and pilot projects was re-emphasized during the year in the course of an informal consultation on integrated family planning at which the need was stressed for research into the possibility of using a wider range of manpower (including the involvement of indigenous workers in some developing countries) to ensure a more adequate level of basic maternal and child health/family planning care. Operational research on rural delivery systems for integrated health services is included in the terms of reference of some of the projects mentioned previously. The Government of Iran has initiated a pilot project in comprehensive maternal and child health/family planning in a model shahrestan ("county") of about 160 000 population, mostly rural, with WHO assistance. The goal of the project

is to develop administrative and service delivery patterns which can be used throughout the country; the demonstration zone will serve as a laboratory for operational research and evaluation and a centre for the training of personnel. Similar projects are under development in Morocco, Sri Lanka, and Thailand. In other countries—Colombia, India, and Tunisia, for instance—special emphasis is given to the maternal and child health/family planning component of wider health service research programmes assisted by WHO.

9.20 An important component of the programme has naturally been the *education and training* of different categories of health personnel and community workers in maternity-centred family planning. Group educational activities for those involved in the programme, ranging from regional seminars for national maternal and child health administrators to seminars and courses for national and international staff, including WHO staff, have been organized with WHO assistance. These are described in Chapter 10.

9.21 Following liberalization of their abortion laws, a few countries have expressed the wish to include abortion services in their programmes. To obtain guidance on the health implications of this, WHO held an informal consultation of experts in obstetrics, gynaecology and epidemiological methodology. In view of the fact that the experience in this subject gathered so far relates almost exclusively to developed countries it was thought that further research was needed, especially in populations which represent different health conditions. As a result, collaborative clinical and epidemiological research on short- and long-term¹ sequelae of abortion is currently under development within the WHO Expanded Programme of Research, Development and Research Training in Human Reproduction described later in this chapter. A fellowships scheme of training in the care of women having abortions has also been initiated in response to government requests.

Development of specific areas within maternal and child health

9.22 In addition to conducting its broad programme for strengthening the maternal and child health component of health services, the Organization supported a number of specific activities designed to extend current knowledge or to develop new approaches to known priority problems.

9.23 Not only in developed countries, but also in the urban areas of developing ones, the number of mothers who go out to work is increasing and the health needs of their children, especially those of preschool age

at home or in day-care centres, are receiving more attention in Member States. In the Western Pacific Region, for instance, the establishment of day-care centres, which afford health workers a good opportunity to reach a particularly vulnerable population group, is being supported by WHO in the Philippines, the Republic of Korea, and the Republic of Viet-Nam. In line with this activity, a seminar was organized in Thailand on the health aspects of the care of normal children in day-care centres and institutions, with participants from the South-East Asia Region and representatives of different organizations in the United Nations system interested in the social welfare and educational aspects of care of children outside their homes.

9.24 A changing pattern in the types of malnutrition and in the age distribution of malnourished children has been noticed in recent years in developing countries and is believed to be partly associated with changes in breast-feeding patterns. Breast-feeding appears to be declining in various parts of the world, with serious consequences, particularly in developing countries; WHO continues to emphasize the value of breast-feeding. WHO participated in a meeting organized by the International Children's Centre on this subject in Abidjan, where it presented a review and analysis of current literature on lactation and reproduction.

9.25 In November a consultation was held at which current practices in the use of growth charts in different health services were reviewed and the possibility was explored of developing a simple growth chart that could be used internationally in maternal and child health programmes at the local health service level to provide information on the growth, development and nutritional status of children less than 5 years old. Examples of growth charts used in 54 countries were collected for this review. The consultation agreed upon and proposed a growth chart of relatively simple design that could be used internationally with a comparable reference value. It is intended to put this proposed chart to the test in several countries.

9.26 At the third symposium in a series on society, stress and disease, in Stockholm (sponsored by WHO and the University of Uppsala), which dealt with psychosocial stresses in the productive and reproductive age and their implications for disease (see also paragraph 4.92), the Organization presented, *inter alia*, a review of the psychological aspects of contraception, particularly as related to the various social roles of women. WHO also participated in July in an interregional seminar on the status of women and

family planning which was sponsored in Istanbul, Turkey, by the United Nations Division of Human Rights. The seminar highlighted the implications for the health services of the status of women; the educational level of the mother and the respect shown for her and her children are important factors in family health and also affect family planning. Ensuring the participation of influential women in the community, such as indigenous midwives or leading members of women's groups, is also important to the development of maternal and child care/family planning programmes.

9.27 The health needs of youth, as seen in the context of the rapidly changing environment in which the younger generations are being raised, were considered in a chapter that the Organization drafted during the year for a forthcoming United Nations report on the needs and aspirations of youth, prepared in pursuance of resolutions of the United Nations General Assembly and the Economic and Social Council.

9.28 Close collaboration was maintained with the International Children's Centre, in Paris, through participation at the semi-annual meetings of the Technical Advisory Committee. Among its activities during the year, the Centre provided a combined course on maternal and child health and the health aspects of family planning for French-speaking participants from the WHO European Region, as well as courses on maternal and child health for UNICEF staff to which WHO also contributed. There has also been greater contact with various child health and paediatric associations, and collaboration with the International Federation of Gynecology and Obstetrics and the International Paediatric Association in the planning of their international programmes.

Nutrition

9.29 A review of the WHO programme in nutrition for the period 1965-71 was submitted to the WHO Executive Board at its forty-ninth session in January 1972.¹ The Board, in resolution EB49.R30, recommended that WHO's activities in nutrition be strengthened to enable the Organization to discharge its international responsibility for the health aspects of nutrition, to assure continuous surveillance of the nutritional situation of populations, and to advise governments on measures for the prevention of

protein-calorie malnutrition, xerophthalmia, nutritional anaemias and other forms of malnutrition. It also recommended continuing cooperation with other international organizations and full participation in the expanded activities of the Protein Advisory Group of the United Nations System (see paragraph 9.35).

9.30 Another review made by WHO, of 29 nutrition surveys carried out during the period 1969-72, has shown that malnutrition in young children, whether in severe or moderate form, is still one of the most serious public health problems in the world. A significant decline in mortality, especially in children under 5 years of age, has occurred in many developing countries in recent years, but there is no indication that the nutritional status of young children has improved.

9.31 In the fight against malnutrition, the Organization follows two main lines of action, one at the national and one at the local level. The first is to persuade individual countries to introduce a food and nutrition policy into the planning of their socioeconomic development. FAO, WHO and UNICEF are working together towards this objective. For instance, the three organizations assisted in the holding of a national food and nutrition seminar in Sudan in March 1972 to give the senior officers of the ministries of health, agriculture, education, and planning a better understanding of the importance of nutrition in national development. In Zambia WHO has also cooperated with FAO in a project financed by UNDP to establish a food and nutrition policy. In the Region of the Americas, the Organization, in collaboration with FAO, UNICEF, UNESCO and ECLA, has begun to develop a regional plan to formulate and implement in every country a well defined food and nutrition policy designed to ensure that enough food to meet nutritional requirements is available and is, in fact, consumed. In Thailand WHO assisted in the establishment of a national food and nutrition institute, responsible for all phases of food and nutrition programmes. The Caribbean Food and Nutrition Institute (CFNI) and the Institute of Nutrition of Central America and Panama (INCAP), both of which are assisted by the Organization, prepared reports on the cost of malnutrition and its effects on human productivity.

9.32 The second line of action is to encourage nutrition activities in the local health services, including organizing supplementary feeding programmes, establishing nutritional rehabilitation centres, providing nutrition education, and training local personnel. A WHO regional seminar was held in Brazzaville

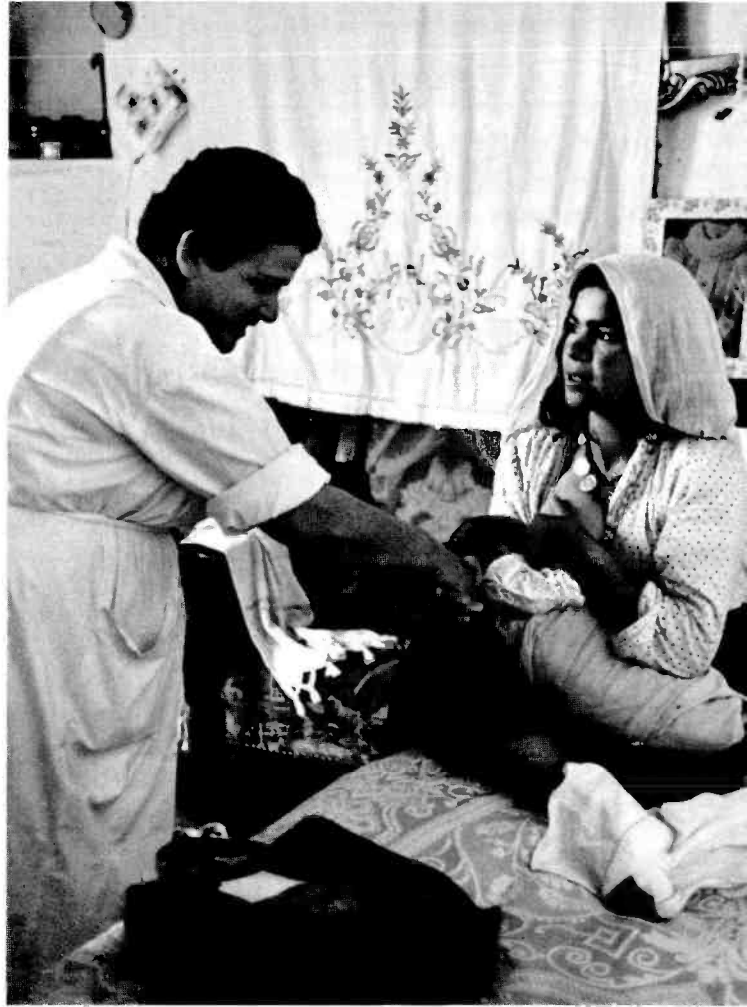
¹ See *WHO Chronicle*, 1972, 26, 160-179, 195-206.

Family health

The health of mothers, children and the family in general is one of the Organization's permanent concerns.

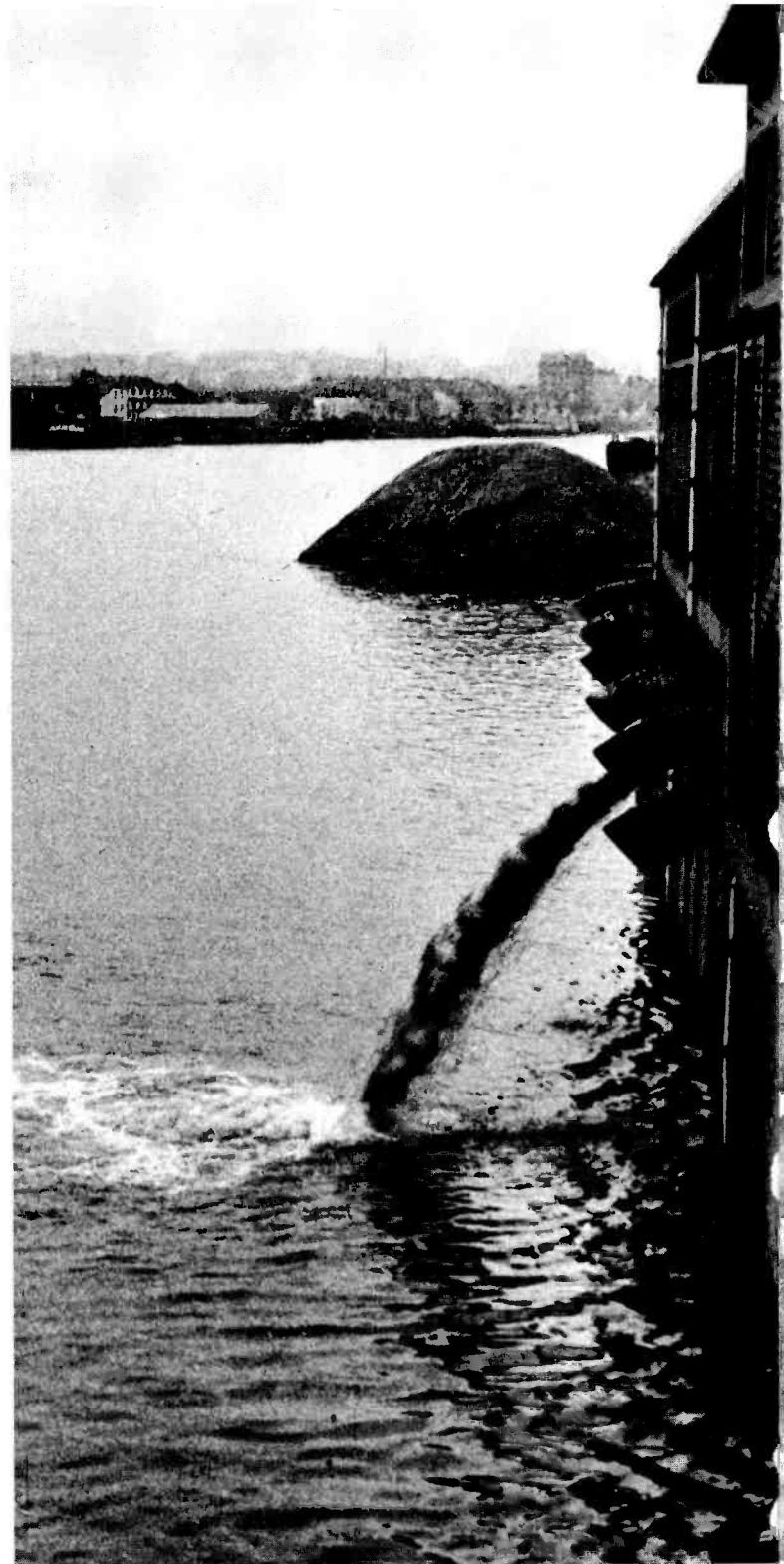
At right: It is through mother and child care that the health services reach the family and obtain the cooperation of the community.

Below: Greek nurses learn how to assess the development and growth of children.





The community to which this Andean woman belongs took part in a self-help project to pipe unpolluted spring water to their village.



Over the last 25 years, water pollution has assumed the dimensions of a major social and economic problem.

Water

At right: Water from an international waterway, the Rhine, before and after purification.

Below: The use of unsafe water for drinking is a main cause of intestinal infections.



Nutrition

At right: *Malnutrition in young children, whether severe (as in this example) or moderate, remains one of the world's most serious public health problems.*



Nursing and midwifery

Below: *In many countries, traditional birth attendants are being trained to play an active part in public health programmes. A village midwife in Sudan learns how to identify drugs by their smell.*



in June to promote such developments in the African Region.

9.33 Following these two lines of action, WHO provided assistance to 60 countries during the year. In a number of them—Singapore is one example—the Organization helped to establish nutrition units in ministries of health; the first objective of these units was to organize a series of nutrition surveys to define the main problems. Most countries of the Region of the Americas had already established such units by 1972. Assistance was also given to nutrition surveys undertaken in Cameroon, Gabon and certain Pacific islands. Help with dietetic services was also provided in Bolivia, Ecuador and Paraguay.

9.34 The clinical picture of severe cases of protein-calorie malnutrition varies widely, kwashiorkor and nutritional marasmus being at the extreme of the spectrum. It is influenced by a number of factors including the age of weaning. In recent years there has been a tendency to overemphasize the importance of either protein deficiency or calorie deficiency whereas in fact the two almost always occur together. This form of malnutrition particularly affects young children. In view of its complex origin, several United Nations agencies are directly involved in its prevention.

9.35 What was previously known as the FAO/UNICEF/WHO Protein Advisory Group became in 1972 the Protein Advisory Group of the United Nations System, since most of the members of that system are at present involved in one way or another in the prevention of protein-calorie malnutrition. The twentieth meeting of the Protein Advisory Group was held in Paris in June 1972. Among the subjects discussed were the strategies used in national supplementary feeding programmes, the interaction and interrelationships of nutrition, family planning and fertility and the current status of locally produced, commercially marketed, protein-rich weaning foods in various countries. The Protein Advisory Group guidelines on human testing of weaning foods were revised as also was the Group's statement on research and development needs relating to the world protein problem. The Group sponsored a conference of paediatricians and food industry representatives to study various aspects of the marketing and promotion of infant foods. The recommendations of this conference, which was held in Paris immediately before the Group's twentieth meeting, have been issued as a Protein Advisory Group statement.

9.36 The *ad hoc* working group set up by the Protein Advisory Group on feeding the preschool

child met in Geneva in December 1972 and discussed the legislative and regulatory aspects of protein-rich foods for infants and children, the standards applying to infant foods and the legislation for the protection of working mothers during pregnancy and lactation. The use of legumes and green leaf vegetables for infant and child feeding was also reviewed.

9.37 The testing on human subjects of the new protein-rich weaning food mixtures developed, promoted or distributed by international agencies comes under the responsibility of WHO and, in 1972, was performed in three centres in Chile, Guatemala and India. Three mixtures developed by UNICEF were tested. In Kasai, Zaire, a programme to promote the use of soya as a weaning food for infants was continued. Products similar to Superamine, a protein-rich weaning food that has been marketed since 1968 in Algeria, are now produced and marketed with FAO/UNICEF/WHO assistance in Turkey and Egypt. Plans for the local production of weaning foods are also progressing in Morocco and Tunisia with assistance from FAO, UNICEF and WHO. SIDA participates in the financing of the project in Tunisia.

9.38 Xerophthalmia continued to be a serious nutritional problem in many developing countries and in particular in South-East Asia, where it is one of the main causes of blindness in children. Its importance was recognized by a WHO study group on the prevention of blindness which met in Geneva in November (see paragraphs 1.251-1.253). In the long run the best way to prevent this disease is to increase the production and consumption of foods rich in vitamin or provitamin A but, in the meantime, more immediate measures must be adopted. This problem was studied during the year both at the meeting of the UNICEF/WHO Joint Committee on Health Policy and by the UNICEF Executive Board. WHO-assisted studies carried out a few years ago in India showed that the administration of massive doses of vitamin A by mouth could prevent xerophthalmia for several months in children. At a consultation arranged by WHO in Hyderabad, India, in March it was agreed that this method conferred a high degree of protection and should be adopted as an immediate short-term measure. The dose recommended for preschool children was 200 000 international units (as the palmitic acid ester of retinol) once every six months, but it was agreed that pilot studies should be undertaken to determine more precisely the effects of different forms and doses of vitamin A, of different routes and periodicities of administration and of various methods of preparation. It was recommended also that studies be carried out on ways and means o

avoiding the occasional transient side-effects observed, especially in very young children, after large doses of vitamin A.

9.39 Food fortification with vitamin A is another measure that may have immediate effects. The Institute of Nutrition of Central America and Panama (INCAP) is carrying out a study in Guatemala on the fortification of sugar with vitamin A; the results obtained so far are promising.

9.40 WHO-supported research on nutritional anaemias during the year was mainly concerned with the prevention of iron-deficiency anaemias. The study of the effect of iron fortification of fish sauce carried out in Thailand in cooperation with the Swedish Medical Research Council is nearing completion and has given positive results as regards the technological preparation of the product, its acceptance by the public and its effectiveness in preventing anaemias. Research by INCAP on the use of sugar fortified with iron is also under way in Guatemala. In India, studies on the prevention and treatment of iron deficiency anaemia in pregnant women are being carried out by the All India Institute of Medical Sciences in New Delhi and by the Christian Medical College Hospital in Vellore. In Caracas, the Venezuelan Institute of Scientific Research continues its work on the absorption of iron, within the framework of the collaborative study undertaken by IAEA and WHO following a joint consultation on iron deficiency held in 1970. WHO also assisted the Ministry of Health of Sri Lanka in organizing a programme for the control of nutritional anaemias in pregnant women and children.

9.41 The Organization assisted national programmes for the prevention of endemic goitre in Burma, Ecuador, Ghana, India, Indonesia, Peru, the Philippines and Thailand. Where the usual method of iodization of salt is not feasible, WHO encourages the administration of iodized oil by injection, particularly in areas where endemic goitre is associated with a high prevalence of cretinism.

9.42 Vesical calculus is a disease of obscure origin that has a certain public health significance in some Asian countries. The influence of the diet in its etiology was one of the main topics discussed at a South-East Asia regional symposium on this disease convened in Bangkok in January.

9.43 The interaction of nutrition and infection is a fundamental health problem to which WHO has directed attention on past occasions. A collaborative study on the effects of malnutrition on the immune

response has now been initiated in several institutions around the world; this is discussed in paragraph 5.18.

9.44 The continuous assessment of nutritional status, on a worldwide basis, is not an easy undertaking. It is even more difficult to select the parameters that could be used to predict a deterioration of the nutritional status of populations. The anthropometric surveys begun in the Western Pacific Region in 1971 and continued in 1972 constitute a first step in the long-term appraisal of trends in the nutritional status in that Region.

9.45 Following the conference of statisticians, computer programmers and nutrition specialists that was held in Argentina in November 1971 to discuss ways of obtaining maximum utilization of computer facilities for the rapid, economic and systematic evaluation of nutrition and health data in the Region of the Americas, guidelines for a standardized methodology in data recording, computer retrieval and analysis were circulated throughout that Region. The Organization cooperated with the Government of Argentina in preparing a project proposal for a food and nutrition data retrieval and analysis centre for Latin America, which is under consideration by UNDP.

9.46 An ILO/FAO/WHO/UNESCO intersecretariat meeting on nutrition education which took place in Geneva in February considered the questions of the groups to which nutrition education should be specially directed and the channels to be used, and formulated suggestions for better interagency coordination and cooperation at all levels.

9.47 WHO, jointly with FAO and UNICEF, assisted the development of national applied nutrition programmes. Depending upon local conditions such programmes may be concerned with nutrition activities under the responsibility of health services, with community agricultural extension aspects, with supplementary feeding in schools, or with a combination of these. The applied nutrition programme in Indonesia, which was begun in 1959, has been progressively expanded and now covers eight provinces and approximately 25 million people living in 11 000 villages. At the request of the Government, WHO reviewed this programme and made recommendations for its future development and adaptation to the local conditions in the provinces. In the Philippines, a joint FAO/WHO team made an evaluation of the applied nutrition programme there, with particular attention to its training aspects. This programme has steadily progressed from a pilot demonstration

project in one area of the country to a substantial education and demonstration programme related to food production and food utilization in 410 schools in 17 areas of the country. Assistance was also given to applied nutrition programmes in several South and Central American countries, India (where one of the most comprehensive programmes of this kind has been under way for many years), Pakistan, Thailand and Zambia.

9.48 The Organization, FAO, UNICEF and the World Food Programme jointly organized a seminar on the planning, implementation and evaluation of supplementary feeding programmes for vulnerable groups which was held at the Regional Applied Nutrition and Agricultural Economy Centre (CRECENA) in Bogotá in November.

9.49 In Malaysia, nutritional activities in rural health centres are being developed together with those in schools and in the agricultural sector of the community. Growth charts (see also paragraph 9.25) are routinely used in clinics, and nutrition education of mothers is regularly carried out.

9.50 The Organization continues to participate in the work of the Codex Committee on Foods for Special Dietary Uses which is convened every year in the Federal Republic of Germany. This Committee, which is part of the Codex Alimentarius Commission, is responsible for elaborating international standards of foods for infants and young children.

9.51 In September 1972 the IX International Nutrition Congress was held in Mexico City under the auspices of the International Union of Nutritional Sciences. WHO was active in the work of the Congress which was largely concerned with nutrition problems in developing countries.

Health education

9.52 Realization of the fact that health education has an essential part to play in determining the right priorities for health services and that "a great deal of serious disease and costly medical care is avoidable if the public knows what steps to take on its own behalf and is motivated to take them"¹ has influenced many governments to become increasingly interested in strengthening health education in order to enlist more

active participation by the community in the solution of problems that affect it and to foster the more effective use of the health services available.

9.53 WHO's work in this field, as in the development of health manpower described in Chapter 10, affects most programmes detailed elsewhere in this report, but has particular relevance to the family health programme, since the community can be effectively reached through the family as a unit and the individuals that make it up. Among the family health aspects upon which special emphasis is laid at the request of governments are family planning and the education in health matters of school-age children and youth. However, as will be seen from the following examples of the work carried out in 1972, this emphasis does not by any means exclude activities at the community and national levels.

9.54 In the African Region, answers received during the year from 14 Member States to an enquiry as to their needs for assistance in health education reflected a very considerable interest in the subject at the *national level*. Several governments received help from WHO with their health education services, notably those of Ghana, Nigeria, Sierra Leone, Togo, and Uganda. In Nigeria, for example, the Organization assisted in the preparation of a proposal for the establishment of a health education service at the federal level which was later approved by the Government. Arrangements have been made to provide prompt assistance to governments in the Region that request help in school health and family life education of school-age children and youth (see also paragraph 9.66).

9.55 In the Region of the Americas the interest of governments in the development of health education services and programmes was stressed at two important regional meetings during the year—the Fourth Meeting of the Caribbean Health Ministers Conference and the XVII Meeting of the Ministers of Health of Central America and Panama. The Organization gave assistance to Peru in the establishment of a new health education plan by the Ministry of Health and in the preparation of means for reviewing the present status of health education services at the national level and in the health services—including hospital areas—at other administrative levels.

9.56 In the South-East Asia Region, WHO support in health education—in many cases in support of family health activities—was provided to a number of Member States for assessing the national or provincial health education services, reviewing and improving health education curricula of professional or auxiliary training programmes, assisting in school health edu-

¹ The quotation is drawn from the proceedings of the Technical Discussions held in May at the Twenty-fifth World Health Assembly and published as No. 49 in the *Public Health Papers* series under the title *Interrelationships between health programmes and socio-economic development*.

cation programmes, formulating guidelines for co-ordinated media production, or helping to initiate the studies that are imperative for sound planning in health education. In India assistance was given for a comprehensive review of the functions of the state health education bureau of Tamil Nadu, in order to foster integration of health education with maternal and child health work, and similar assistance was requested by the Indian Government for other states. UNICEF continued to provide assistance to the state and district health education bureaux in India and to WHO-assisted school health education projects in Nepal.

9.57 In the Eastern Mediterranean Region, WHO assisted with a review of both Government and privately operated health education services in Ethiopia to determine how these might be strengthened; and in the Western Pacific Region it continued its aid to the British Solomon Islands Protectorate for amplifying health education in the general health services and in the malaria eradication campaign.

9.58 The effectiveness of community involvement in health programmes depends to a considerable extent on the incorporation of specific and systematic health education from the earliest stages of the planning of health projects. In view of this, emphasis has been placed in the European Region on health education as an integral part of all long-term regional programmes. For example, in April, a working group was convened in Hamburg to consider methods of health education for young people regarding drugs and the further development of educational components of long-term programmes for the prevention and control of drug abuse and drug dependence.

9.59 A WHO study group on health education in the health aspects of family planning recently described family planning "as a way of thinking and living that is adopted voluntarily, upon the basis of knowledge, attitudes, and responsible decisions by individuals and couples, in order to promote the health and welfare of the family group and thus contribute effectively to the social development of the country"¹ This concept has been a guiding principle in the health education activities that are an integral component of many WHO-assisted programmes in *family health* which include the health aspects of family planning. During 1972, there was a very considerable expansion of WHO assistance in this field, notably in the Regions of the Americas, South-East Asia and the Western Pacific.

9.60 A consultation on health education in family planning was held in Washington, D.C. in April to prepare a draft guide which could be tested and then modified as required for use in the review and appraisal of the educational component of national and local programmes with particular reference to health aspects of family planning. Participants from 13 countries in the Region of the Americas took part, representing health administration, health education, maternal and child health, medical education, and nursing. Follow-up activities were started later in the year for a pretesting of the draft guide by interested programme administrators and persons responsible for the educational component of programmes concerned with the health aspects of family planning in the Americas. This guide may be tried in other WHO Regions as well. The Organization helped Uruguay in developing the health education aspects of maternal and child health.

9.61 An advisory team on the development of educational materials for family health which has been established in the Western Pacific Region includes a social scientist experienced in health education. This team was set up following a workshop in Manila in February which was attended by 16 participants from different countries in the Region and representatives of numerous international and national organizations. The objectives of the workshop were to help foster an integrated approach to educational activities in relation to nutrition, maternal and child health, and the health aspects of family planning, and to provide the participants with experience in the actual planning, pretesting and production of information-education materials for selected groups. The recommendations made at the workshop were followed up later in the year by members of the team who visited Malaysia, the Philippines, Republic of Korea, Republic of Viet-Nam, and Singapore. Health education was also one of the major components of two WHO staff training courses on the health aspects of family planning held during the year in the Western Pacific Region, and of a similar course in the Eastern Mediterranean Region.

9.62 A workshop on health education for family health and well-being was held in November-December in Sousse, Tunisia, for participants from that country and Algeria. This was designed to offer practical training and experience in applied health education to senior supervisory staff concerned with maternal and child health and family planning, to foster integration of health education in the health services and to develop team work in family health, with particular emphasis on family planning as a health measure.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1971, No. 483, p. 5.

9.63 A consultation was also arranged in December in New Delhi jointly by UNESCO and WHO to identify the most urgent needs of national family planning programmes in matters of education and communication and to indicate the areas requiring assistance from the two Organizations.

9.64 Health education of *school-age children and youth* received considerable attention during the year, and more stress was put on combining this with education in family life and population dynamics, in response to an increasing number of requests from countries for assistance in this area. For such work close collaboration is maintained with UNESCO.

9.65 In some countries priority was given to training teachers and those responsible for their training in the integration of instruction in health into the school curriculum. In the Region of the Americas, for instance, the Government of Ecuador, following advisory assistance from the Organization, established in February a joint commission of health and education to serve as an advisory and coordinating body for the promotion of school health and of health education of school-age children and youth; and 18 courses in those subjects were held in which a total of 668 faculty members of teacher-training institutions, school supervisors and teachers participated. Support was also provided to Argentina, Bolivia and Brazil for developing health education of school-age children and youth, teacher training, and parent education.

9.66 Countries in the African Region receiving WHO support for introducing health education of school-age children and youth included Ghana, Nigeria, Uganda and Zambia. In the last-mentioned country, WHO assisted national authorities and educators in the organization of a seminar devoted to curriculum development and contributed also to the preparation of handbooks for the teaching of environmental sanitation and related health topics. Teaching of school health and family life education was a feature of several WHO-assisted national and local workshops in Burma, India, Indonesia, Nepal, and Sri Lanka; and WHO continued to take an active part in helping to encourage the national joint committees on school health education with representatives from both education and health departments which are now working or being established in all countries in the South-East Asia Region. In Ethiopia, where school enrolment is reported to have more than tripled over the past decade, WHO assisted national authorities to formulate means of strengthening school health education, particularly in primary schools and in the five teacher-training institutions. In Malaysia WHO

health education advisory services were continued, with teacher training in school health and health education as one of the major activities.

9.67 As in the past, WHO cooperated with UNESCO on the health component of the functional literacy programmes, and assisted the teaching programmes of the Arab States Functional Literacy Centre in Egypt that is sponsored by UNESCO.

9.68 The success of many *environmental health* programmes may hinge not only upon economic factors, but also on gradual shifts in traditional community beliefs and practices, which are linked with social and cultural patterns. The Organization is accordingly increasing its attention to ways and means of stressing the health education element in WHO-assisted environmental health programmes. In Africa, for example, a health education specialist with a WHO-assisted environmental health project in Ibadan, Nigeria, is helping to develop community organization and participation in water and sewage disposal; an interesting feature of this project has been the use of an itinerant educational theatre featuring local health needs and services. In the Region of the Americas, a working group was convened to prepare a manual on community development in support of rural water services in Latin America based on experience acquired in various countries of the Region. In addition, the Organization collaborated with the Faculty of Engineering, University of Costa Rica, in incorporating health education aspects in a course on rural water development in Costa Rica in February. In the South-East Asia Region, health education was one of the subjects emphasized at a technical meeting held for environmental health workers engaged in WHO-assisted projects.

9.69 A study was made of the long-term and short-term measures that the Organization might take to ensure a closer working relationship between environmental health and health education personnel at the field, national and regional levels and to incorporate a health education element into environmental health programmes from the planning stage.

9.70 Any attempt to influence behaviour that affects health must, of course, be grounded upon a knowledge of the factors (social, psychological, cultural, economic and other) that cause such behaviour and that may hamper the efforts of the person, the family, and the community to improve the standard of living. *Research* on educational problems concerned with individual health behaviour and on approaches to more effective community involvement in health and related developmental programmes is still qualitatively and quanti-

tatively inadequate; and WHO seeks to help governments to conduct applied studies and research with respect to what people know and do about health—about the reasons for their failure, delay or apathy in using the health services available, and about the channels of communication through which people learn about new ideas and practices in family health.

9.71 In 1972, for instance, an investigation into health behaviour was started in Indonesia with WHO assistance. As a first step, 70 studies that had been conducted in the country and that had health or health education implications were looked into and 20 of them analysed in detail. On the basis of this survey the National Health Research Council of Indonesia approved 10 priority problems for study, and six of these were investigated in 1972. The study models prepared with WHO's aid were found suitable for wider application and other studies were initiated. Studies in health behaviour were also initiated in Sri Lanka with the participation of the University of Sri Lanka. In Brazil, assistance was given to the University of São Paulo for a study of the effect on parental health behaviour of the health education of their children at school.

9.72 The initial phases of a WHO-supported study on health education in health centres and teaching hospitals carried out by the National Institute of Health Administration and Education in India was completed in 1972. In the light of the findings a new research project was initiated with WHO support that focuses on a study of the factors influencing the adoption by hospital patients and their accompanying relatives of practices related to the health aspects of family planning.

9.73 Two WHO-assisted research projects deal mainly with the impact of health education on infant morbidity and mortality. In Jamaica, the Department of Social and Preventive Medicine, University of the West Indies, Kingston, continued with a study of the effect of health education of mothers on infant morbidity; and in Ethiopia, the Department of Preventive Medicine and Public Health, Haile Sellassie I University, Addis Ababa, initiated a study in 1972 on the impact that the training of local midwives in public health and health education has on neonatal mortality.

9.74 In all Regions the Organization provided assistance in the planning and conduct of pre-service and in-service *training* of professional and auxiliary health workers (see also Chapter 10). In Bolivia, help was given for preparing a health education training project for health workers and in developing further

in-service training for health education personnel. In Thailand, advice was provided for planning the integration, over five years, of health education into all health programmes and especially those concerned with such priority subjects as maternal and child health, family planning, environmental health and communicable disease control. A feasibility study was carried out in seven African States to determine what facilities and resources were available for developing undergraduate and postgraduate training in health education in medical institutions, and WHO also gave assistance for a seminar on health education methods and techniques held at Kintampo, Ghana. In the Republic of Viet-Nam, WHO provided the services of a health education specialist in the National Institute of Public Health.

9.75 In India, Indonesia and Thailand the Organization assisted in the establishment of rural field practice areas to provide practical experience as part of postgraduate health education courses. Criteria for the selection of both rural and urban field training centres were among the topics considered at a workshop held in New Delhi in October, when participants from most countries in the South-East Asia Region met to develop guidelines for field training in health education. WHO has also utilized other channels for manpower development in the field of health education. For example, it has continued to assist certain countries in the European Region in organizing national courses for the training in health education of doctors who occupy key posts.

Human reproduction

9.76 Until recently, research in human reproduction has been a relatively neglected area. One important reason for this is probably the fact that patterns of reproduction were not sufficiently recognized as major factors contributing to the health of individuals and families. In some parts of the world, special concern about family planning has also focused attention on human reproduction. These considerations have led to a growing awareness by public health authorities of the importance of the health aspects of human reproduction, and to a growing demand from the governments of Member States for advice and assistance on this subject. Such is the state of scientific knowledge in this field, however, that the best services can hardly be provided until a considerably greater research effort has helped to resolve many problems relating to the understanding of human reproduction processes in general. This has led to the development of one of the Organization's larger research pro-

grammes, covering all areas of research in human reproduction, although the emphasis placed on different aspects varies. Within the overall programme, research is promoted on the biomedical, epidemiological and operational aspects of family planning, on sterility, pregnancy, lactation, and on other aspects of reproductive health and disease. These activities have been financed from the Organization's regular budget, from contributions to the Special Account for Medical Research and from UNFPA funds.

9.77 Research into the biomedical aspects of fertility regulation is mainly conducted within a subdivision of the overall programme known as the *Expanded Programme of Research, Development and Research Training in Human Reproduction*. The Expanded Programme's first 12 months of operation (1971-72) was funded by voluntary contributions to the Special Account for Medical Research, amounting to US \$4.4 million.

9.78 The donors—the Danish International Development Agency, the Norwegian Agency for International Development, the Swedish International Development Authority, the International Development Research Center, Ottawa, and the Ford Foundation—together with nine other interested agencies, met in Geneva in October 1972 to review the progress of the Expanded Programme and discuss future funding.

9.79 A description of the framework in which the Expanded Programme was started has appeared in the *WHO Chronicle*.¹ Its objective is to develop a variety of safe, acceptable and effective methods for the regulation of human reproduction. It adopts a predominantly clinical orientation with emphasis on research and development likely to yield results within a reasonable period of time and selects areas in which an international collaborative research effort would be most likely to accelerate development. A fundamental principle of the Expanded Programme has been to build on established research groups rather than to create new institutions. This strategy complements other WHO activities in reproduction research, which will be discussed later in this section.

9.80 The selection of priority areas in which to initiate research and development within the Expanded Programme was one of the most important steps taken during the year. A series of planning meetings, involving more than 150 scientists from 46 countries, were held, and by the end of 1972, 33 collaborative research projects had been organized and funded by

WHO, and many others were under development or undergoing technical review.

9.81 Three main approaches have been adopted that involve support to: (a) research and development on specific new and improved methods of fertility regulation; (b) research on reproductive processes most susceptible to regulation; and (c) research that provides the necessary bases to facilitate assessment of existing methods of fertility regulation.

9.82 Specific methods that are being developed under the first approach include new types of contraceptive devices which will affect sperm migration. Another method under study is a medicated intra-uterine device that will release hormones at a constant rate. New chemical and surgical methods of sterilization are also being developed. The efficacy, safety and acceptability of prostaglandins and their analogues for fertility regulation are being studied in collaborative trials by different institutions employing common protocols. In the assessment of the usefulness of each of these new methods, comparisons are also made with the methods at present in use.

9.83 The second main approach, the identification and support of research on reproductive processes most susceptible to regulation, has included the following among the most promising areas: the regulation of ovum transport, including post-coital contraception; the regulation of implantation, including the immunological approaches; interference in the male with the fertilizing ability of sperm; regulation of sperm migration and survival in the female; and ovulation detection.

9.84 The third approach includes studies of the characteristics of different methods of fertility regulation that affect their acceptance in different socio-cultural settings; development of better pharmacological models for the screening of potential fertility-regulating agents; assessment of the sequelae of vaginal occlusion; and studies of the sequelae of abortion. Among the last-mentioned, epidemiological studies are under way in Singapore and Yugoslavia on the short-term sequelae; they focus on differences in the type and rate of the sequelae and their relation to the different methods of abortion used and the type of care given to the patients. A protocol for the study of the long-term sequelae of abortion, in particular infertility, late fetal wastage and prematurity in subsequent pregnancies, has been developed, and will shortly be adopted in several centres. The third aspect of abortion upon which collaborative research is focusing concerns the hazards to health from repeated

¹ Kessler, A., Perkin, G. W. & Standley, C. C. (1972) *WHO Chronicle*, 26, 102-106.

abortions, and the risks of combining abortion with sterilization procedures.

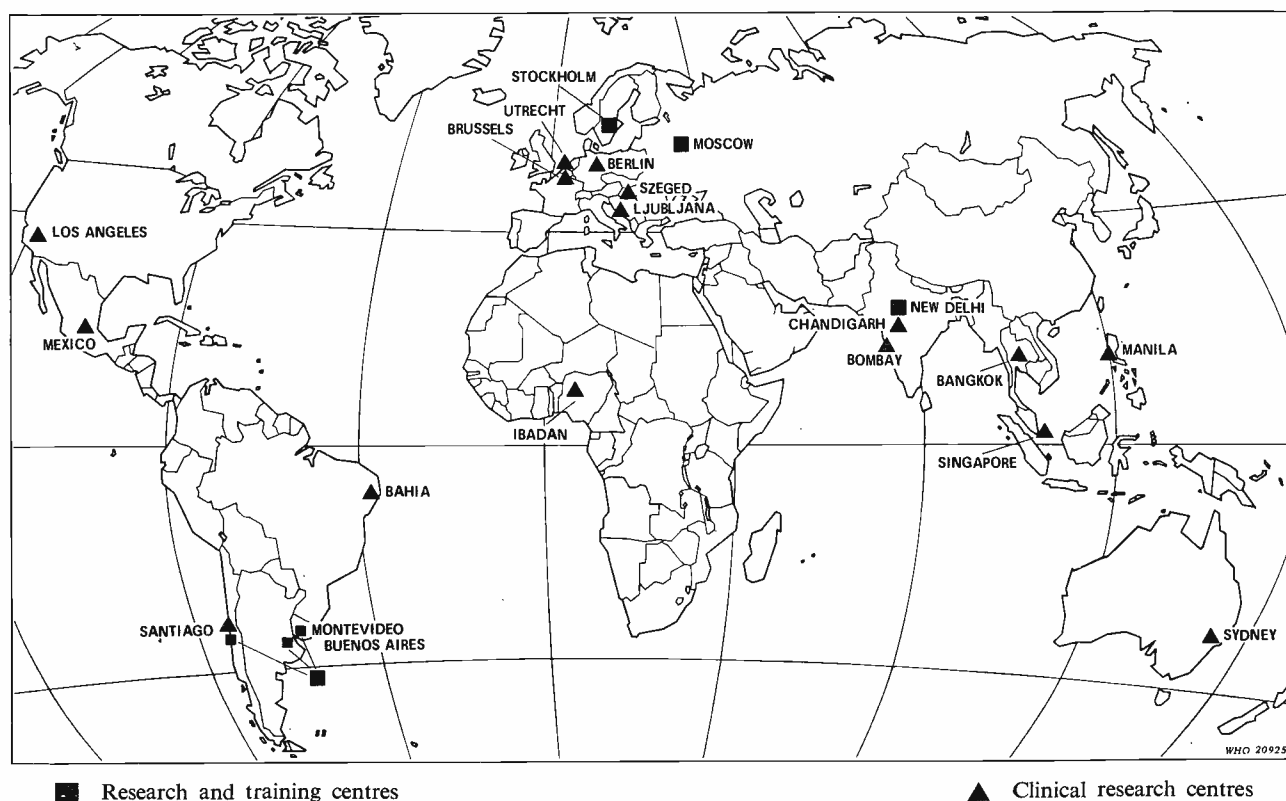
9.85 Another major aim of the Expanded Programme is to remedy what has been a serious deficiency—namely, the lack of comparable clinical trials with new fertility-regulating agents. These trials are needed to determine the efficacy and acceptability of new contraceptive agents in different parts of the world and to detect any side-effects, particularly those that may be due to ethnic or other differences between populations.

9.86 During 1972, a network of WHO clinical research centres has been established that includes 16 institutions in different parts of the world, as shown in Fig. 4. The centres provide a ready facility for testing new methods emerging from the collaborative research projects described above, or methods from other sources (other organizations, individual scientists, industry). The centres will also participate in WHO-sponsored studies of existing methods. Several centres have already begun collaborative studies, employing common research protocols. Further centres may be designated to achieve further geographical coverage.

9.87 Discussions concerning collaboration with industry in the research and development of new contraceptive agents were started at a meeting of scientists from pharmaceutical firms engaged in such work that was convened by WHO in February. Agreements have been reached with three firms, and the clinical research centres will conduct trials of the new agents. The agreements provide for public sector rights in return for WHO's investment in the development of the drug or device.

9.88 Another mechanism that has been adopted in the Expanded Programme for stimulating research in fertility regulation is support to relatively large groups of scientists in institutions identified for their interest and achievements in this area of research. The WHO support aims at fostering the multidisciplinary aspect of their work, expanding their present research and training activities, and enabling them to act as a service facility to the Expanded Programme, by providing consultant assistance to it, organizing meetings on request, or undertaking the publication of proceedings of meetings on topics relevant to the Expanded Programme. Although there are numerous precedents in such fields as cancer research, neurobiology and molecular biology, this approach has

Fig. 4. Research and training centres and clinical research centres in the WHO Expanded Programme of Research, Development and Research Training in Human Reproduction



hardly been attempted so far in reproduction research. Following a feasibility study conducted in 1970-71, four institutions that fulfilled stringent criteria established by WHO were designated Research and Training Centres in Human Reproduction; these are also shown in Fig. 4. They are the All-India Institute of Medical Sciences, New Delhi; the All Union Scientific Institute of Obstetrics and Gynaecology, Moscow; five of the institutions in Buenos Aires, Montevideo and Santiago grouped in the "Three Nations Programme", the Latin American Institute of the Physiology of Reproduction, Buenos Aires, being the central office; and the Karolinska Institute and Hospital, Stockholm.

9.89 In addition to carrying out intramural, inter-departmental research of a multidisciplinary nature, the research and training centres have begun to participate in the inter-institutional collaborative research projects mentioned above. A first meeting of the directors of the four centres was held in December to lay the basis for their collaborative work. The role of these centres in providing research training specifically related to the objectives of the Expanded Programme was discussed at a consultation in October, when the training functions and needs both of the four centres and of the clinical research centres was discussed and a short-term training strategy for the Expanded Programme was proposed.

9.90 Twenty-one research training grants were awarded under the Expanded Programme during the year. Support was also provided for the two-year 1972-73 Latin American Training Course on Reproductive Biology, held in Argentina, Chile and Uruguay. This is part of the "Three Nations Programme," which groups nine institutions in these countries in a collaborative research and training activity in reproductive biology. The five institutions that were designated as a joint research and training centre (see above) were those with a particular interest in fertility regulation.

9.91 Other projects carried out under the Expanded Programme are an extension of existing activities in the overall WHO programme in human reproduction, but with a focus on assistance to research on fertility regulation. An increased effort to provide essential supplies has been made where the lack of spare parts and reagents has been found to constitute a major obstacle to research in institutions other than those already receiving support from the Expanded Programme.

9.92 A small contracts programme was also initiated to give limited assistance to scientists who have

returned to their own country following a period of specialized research training abroad. Such support has been given to scientists at Mahidol University, Bangkok, the Latin American Institute of the Physiology of Reproduction, Buenos Aires, and the Post-graduate Institute of Medical Education and Research, Chandigarh, India. The Organization also provided assistance for the further development of reproduction research at two institutions in Nigeria and Thailand.

9.93 Two technical meetings relevant to the objectives of the Expanded Programme were convened. A workshop was held in June in collaboration with the University of Geneva to review present data on the possible relationship between the use of hormonal contraceptives and the occurrence of chromosomal and anatomic anomalies in the products of subsequent pregnancies. In September another group of scientists reviewed current knowledge and indicated research required on the subject of cervical mucus. This is relevant both to the treatment of sterility and to the development of new contraceptive agents.

9.94 Implementation of the Expanded Programme in its first year of operation has required establishing advisory and review mechanisms, and instruments for programme management. A group of twelve scientists and research administrators was appointed to advise WHO on research strategy and priorities, mechanisms for implementation of the Expanded Programme, and allocation of financial resources among its various components. This advisory group met in June and November 1972. A review group was also constituted to undertake the technical and ethical assessment of projects that it was proposed to fund under the Expanded Programme.

9.95 As was mentioned at the beginning of this section, the Expanded Programme addresses itself solely to the rapid improvement of existing methods and the quick development of new methods of fertility regulation. Such activities as helping to build up research institutions in the context of national family planning programmes, or epidemiological and operations research in human reproduction and family planning, are carried out in the *overall WHO programme in human reproduction*, which receives a large measure of support from UNFPA funds. The projects aim at studying, or at developing the resources required to study, factors affecting the provision and acceptance of family planning, including in particular the occurrence of side-effects from contraceptive agents in different populations. Such activities have been developed in 1972 in Egypt, Iran and Pakistan. In all cases, WHO support has included scientific and technical advice, the provision of supplies

and equipment, salaries for additional personnel, and research training grants and exchange of scientific workers between institutions.

9.96 In Egypt, seven research groups have been supported in Alexandria, Asyut and Cairo. The research projects include studies of the metabolic effects of oral contraceptives, the mechanism of action and side-effects of intrauterine devices, female sterilization, and early interruption of pregnancy.

9.97 In Iran, the Government of Iran and WHO have contributed equally to the establishment of the Centre for Research in Reproduction, Teheran. The Centre will provide hormone laboratory services for clinical research in family planning in Iran, and will carry out studies of the mechanism of action, effectiveness and side-effects of intrauterine devices and injectable progestogens. Endocrinological studies have been supported at the University of Teheran. WHO has assisted the University of Shiraz in establishing a hormone assay facility. At the University of Isfahan it is supporting studies of the side-effects of oral contraceptives.

9.98 In Pakistan, besides a number of clinical and epidemiological research projects relating to the family planning programme, several biomedical research projects have been assisted. A primate colony for reproduction research is being set up in Islamabad, and a hormone radioimmunoassay facility has been developed in Karachi. The national contraceptive testing laboratory also received support.

9.99 A WHO research team on the methodology of clinical trials of fertility-regulating agents was established in 1972 at the Chulalongkorn Hospital, Bangkok. The team consists of a WHO pharmacologist, obstetrician, and epidemiologist and national counterpart and supporting staff. Hormone assay facilities have been established, and research under way includes determination of baseline hormone levels in Thai women and the effect of contraceptive agents on these levels; the effect of injectable contraceptives on metabolic and hepatic functions; the detection of post-operative occult thromboembolism in Thai women, previous studies on this having been done in Caucasian women only; and a comparative study of the effect of different contraceptive agents on liver function.

9.100 WHO support within the overall programme was also given for a number of specific clinical investigations. Studies on blastocyst implantation and differentiation *in vitro* were conducted at the Institute of Human Anatomy, Uppsala, Sweden. The Depart-

ment of Medical Physiology, Nairobi, investigated muscle-relaxing agents in pregnancy. Studies on the milk ejection reflex action were conducted by the Institute of Neurobiology, Buenos Aires. Oestrogen metabolism, including levels during lactation, was investigated at the Department of Chemical Pathology, Ibadan, Nigeria. The mechanism of action of copper intrauterine devices was studied at the Welsh National School of Medicine, Cardiff, United Kingdom. The Institute of Biostructure, Faculty of Medicine, Warsaw, conducted research into early mammalian development. Studies were carried out at the All-India Institute of Medical Sciences, New Delhi, on hormonal influence on the biochemical constituents of oviduct fluid.

9.101 The collaborative epidemiological studies on the effects on family health of patterns of family formation, started in 1970, entered a new phase. Data collection was finished in the four centres in India, Iran, Lebanon and Turkey that had first joined the studies and was nearly completed in the Philippines. Four new centres, in Colombia, Egypt, Pakistan and the Syrian Arab Republic, joined the studies. The investigators in the studies met in Geneva for a consultation in March; progress was reviewed, plans for computer analysis were finalized and a schedule for reporting the results was drawn up. Preliminary analysis of the results from the first four centres has begun.

9.102 A WHO Scientific Group on the Application of Epidemiological Methodology to the Health Aspects of Family Planning, in March, reviewed studies on family planning in which the concepts and methods of epidemiology either have been applied or could profitably be applied. It also identified areas in which further research was particularly required.

9.103 A WHO International Reference Centre for Epidemiological Studies in Human Reproduction was designated at the Carolina Population Center, University of North Carolina, USA. It will advise on the design and conduct of such studies, develop appropriate methodological tools, and assist WHO in identifying and ascribing a priority to research problems in human reproduction and family planning that require investigation by epidemiological methods. It will also serve to train research workers and disseminate relevant information. To assist WHO and this international reference centre in the international coordination of studies of human reproduction, the Gandhigram Institute of Rural Health and Family Planning, India, was designated a collaborating institution.

9.104 The results obtained to date in a collaborative study on gonadotrophin therapy that is coordinated by the WHO International Reference Centre for Fertility Promoting Agents, at Tel-Hashomer, Israel, were among the topics discussed by a WHO Scientific Group on Agents Stimulating Gonadal Function in the Human that met in August. Attention was focused on clinical research, with the aim of better defining the selection of patients for treatment with fertility-promoting agents, the choice of appropriate agents and regimens, and the methods of monitoring patients under therapy.

9.105 A WHO Scientific Group on Reproductive Function in the Human Male, in September, reviewed such data as are available on several aspects of male reproduction, such as development and maturation of the spermatozoon, the role of the accessory glands and appraisal of the quality of semen. Many of these data relate to experimental animals and require validation in man.

9.106 Periodic review of new developments in fertility control has been ensured by the regular convening of scientific groups on this subject. A WHO Scientific Group on Advances in Methods of Fertility Regulation that met in December considered, in particular, the outcome of recent research on the use

of prostaglandins, long-acting steroidal contraceptives, especially injectable preparations, new intrauterine devices, methods of sterilization by tubal occlusion, and post-coital contraceptives. In preparation for this meeting, a consultation had been held in November to review the present state of knowledge on the efficacy, safety, acceptability and health service implications of medroxyprogesterone acetate.

9.107 WHO continued its collaboration with the Karolinska Institute in Sweden in the organization of the Karolinska Symposia on Research Methods in Reproductive Endocrinology. The fifth symposium, held in Stockholm in May, dealt with methods for the study of gene transcription in reproductive tissue.¹

9.108 In the field of research training, besides the activities reported above in connexion with the Expanded Programme, additional research training grants in human reproduction have been awarded; and in Spain, WHO support was given for a seminar on reproductive biology, intended to stimulate research in this field and organized by the Barcelona Faculty of Medicine in October.

¹ Diczfalussy, E., ed. (1972) *Gene transcription in reproductive tissue*, Stockholm, Karolinska Institute.

10. HEALTH MANPOWER DEVELOPMENT¹

10.1 The scarcity and frequent misuse of health personnel are still acute problems in both developed and developing countries. During the year, the programme in education and training was enlarged to include all the Organization's activities relating to the development of health manpower as a means of strengthening national health services.

Health manpower planning

10.2 In collecting the information on which successful decision-making in health manpower planning depends, the need for matching the supply to the demand must be borne in mind. The information must also be such as to permit the early detection and correction of any geographical or occupational imbalances in the manpower situation.

10.3 Among the activities assisted by the Organization in the Region of the Americas were: an analysis of data collected in a national health survey in Argentina, including an assessment of the training provided for selected categories of basic health personnel; the development of a descriptive model of a system of nursing in order to determine educational needs in this field; and a survey of the relationship between the number of nutrition personnel available and the number employed, the number under training, and the staff needed for the nutrition programmes planned in different countries of the Region.

10.4 In the South-East Asia Region, the Organization helped to set up a central data processing unit

in Indonesia as part of a scheme for providing reliable information on health resources in the country, and, with USAID, strengthened assistance begun in 1971 for long-term development of health education manpower. The Government of Nepal is grouping the existing schools for nurses, auxiliary health workers and laboratory technicians under a single administration; in this connexion, WHO is helping to draw up an overall plan combining health manpower development and measures to accelerate the development of the health services. As part of a WHO-assisted study of health manpower, started in Sri Lanka in 1971, a number of subsidiary studies on such subjects as the utilization of doctors, the educational process, and the activities of rural health personnel are being carried out and several of them were completed during 1972.

10.5 Health manpower requirements were among the subjects discussed by WHO working groups held in the European Region on problems of health planning in national development (Stockholm, June), on the evaluation of public health programmes (Burgas, Bulgaria, August-September), and on environmental health programmes (Copenhagen, November).

10.6 Health officers from several countries in the Eastern Mediterranean Region took part in a WHO training course on health and manpower planning, which was held in Teheran and Alexandria (Egypt) from November 1971 to January 1972.

10.7 In the Western Pacific Region, the Organization has suggested interim measures for the partial alleviation of current manpower shortages in the Republic of Viet-Nam and proposed certain long-term measures.

10.8 A WHO-assisted study of nursing manpower and nursing education carried out in 1971 in some South Pacific countries and territories was followed up by an intercountry workshop on nursing advisory services, held in Suva in September. The Organization also assisted in surveys of nursing and midwifery management systems in a number of countries in different parts of the world.

10.9 In accordance with resolution WHA25.42 of the Twenty-fifth World Health Assembly, WHO is continuing a study on the international migration

¹ An effort has been made to give, in this chapter, examples of WHO activities concerned with the development of health manpower, including courses and seminars. They are, however, too numerous to detail exhaustively; a more complete list appears in Part III of this report. Moreover, in some programmes (those concerned with immunology and with human reproduction, for instance) research and training are closely linked and cannot be treated separately; the reader is therefore referred to the reports on those programmes for an account of their educational and training aspects.

Within the present chapter, there is inevitably some overlapping between the activities described under the different headings—for example, teacher training and educational technology. In addition, training in, for example, public health is often given in the same institutions at both the undergraduate and the postgraduate levels and it has not been possible to deal with each level of training separately in every case.

Finally, it should be noted that the majority of WHO-assisted projects, particularly country projects dealing with the organization of health services, include education and training.

of health personnel—in particular, physicians and nurses. This should enable the Organization to assist Member States in formulating legislation on the subject that would reconcile the rights and freedom of the individual health worker with the interests of the state and the international community. A survey of the international movement of medical students in the countries of the Americas has also been undertaken by the Organization, in collaboration with the Bureau of Health Manpower Education of the US National Institutes of Health.

Education and training of health personnel

10.10 It is widely recognized that the links between institutions training health workers and the agencies responsible for providing health care tend to be exceedingly weak, even though *educational planning* should be geared to manpower requirements. Unfortunately, existing systems of education in medicine and the health sciences often fail to take the actual needs into account and to establish clearcut educational objectives. Although a number of Member States are now seeking to rectify the situation, changes in educational approaches and ideas take time and the introduction of the necessary innovations will certainly

call for continuous assistance and support from the Organization.

10.11 WHO has continued, as in the past, to give active *assistance to training institutions*, especially in the developing countries. This has taken the form of short- and long-term advisory services and assignments of teaching staff (see Table 3) with a view to introducing modern educational concepts, as well as aid in setting up new institutions or developing existing ones. The assistance provided has covered all levels of training, from auxiliary to postgraduate, in medical schools, schools of public health, veterinary schools, schools of dentistry, schools of pharmacy, schools of nutrition, nursing schools, sanitary engineering schools, schools for auxiliaries and various other institutions for training in the health sciences. In addition, books and other teaching materials have been provided, in particular through the Revolving Fund for Teaching and Laboratory Equipment for Medical Education and Training. WHO has also continued its support to multiprofessional teaching institutions for medical and allied health personnel, for instance in Cameroon at the University Centre for Health Sciences, Yaoundé, and in Japan at the College of Health Sciences, University of the Ryukyus.

Table 3. *Assignments of teaching staff, 1972*

1. For training professional personnel * – (by subject)			2. Countries and territories to which assigned (continued)			
	Teachers	Months				
Basic medical sciences	42	317	Gabon	2	Panama	2
Paediatrics, maternal and child health	13	64	Ghana	2	Papua New Guinea	6
Clinical and related fields	32	264	Guinea	1	Paraguay	2
Public health and preventive medicine (including hospital administration and statistics)	36	283	India	18	Peru	1
Dental education	5	31	Indonesia	11	Qatar	2
Nursing	98	954	Iran	7	Republic of Korea	1
Environmental health	20	196	Iraq	9	Republic of Viet-Nam	6
Veterinary public health	4	9	Israel	3	Rwanda	3
	250	2 118	Italy	1	Senegal	7
For training auxiliary personnel	64	641	Japan (Ryukyu I.)	8	Sierra Leone	2
	314	2 759	Jordan	2	Singapore	1
			Kenya	9	Somalia	8
			Khmer Republic	2	Sri Lanka	8
			Laos	10	Sudan	7
			Lebanon	3	Syrian Arab Republic	4
			Libyan Arab Republic	5	Thailand	6
			Malawi	3	Togo	2
			Malaysia	5	Tunisia	5
			Mali	3	Turkey	3
			Malta	1	Uganda	1
			Mauritania	1	United Republic of Tanzania	7
			Mauritius	2	Upper Volta	1
			Mexico	1	Yemen	10
			Mongolia	6	Zaire	19
			Morocco	4	Zambia	4
			Nepal	3		
			Niger	3		
			Nigeria	6		
			Pakistan	2		
					Total	314

* Some instructors were engaged in the training of both professional and auxiliary personnel.

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10.12 The Organization collaborated in a study to formulate a national policy for the establishment of medical schools in Brazil and is helping with a survey of the academic and administrative functions of the School of Public Health of Mexico. It also provided technical assistance to universities in the Dominican Republic, Nicaragua and Panama wishing to adopt an integrated approach to the teaching of the health sciences. A system of grants to schools of health sciences in the Americas has been developed by the Organization in order to strengthen their activities in different fields, including population dynamics.

10.13 WHO continued to pay special attention to the training needs of physicians, nurses, midwives and allied health workers who are actively involved in family health and related services.

Intermediate and auxiliary health personnel

10.14 The Twenty-fifth World Health Assembly, in resolution WHA25.42, stressed the importance of WHO assistance in encouraging Member States to intensify the training and use of auxiliary health personnel.

10.15 Two WHO consultations on the subject of auxiliary health personnel were held in Geneva in April 1972. The first proposed a descriptive formula for the classification of health personnel, based on criteria of performance rather than criteria of education; the second outlined measures that might be taken by the Organization to encourage the use of the medical assistant type of health worker.

10.16 WHO-assisted analytical studies of the use of auxiliary personnel, carried out during the year in Brazil, Egypt and Hungary, provided information that will be helpful in reviewing the composition of the various types of health team, the distribution of functions among their members and the adaptation of training programmes to these functions. These studies have now been extended to cover family health activities, including family planning and community development. Assistance was given to the Government of Algeria in the establishment of a training college for teachers of health auxiliaries.

10.17 The Organization helped a number of countries to hold courses for *malaria workers* and, where the malaria eradication programme had reached a sufficiently advanced stage, to retrain malaria personnel as multipurpose workers.

10.18 In most countries, *auxiliary nurses and midwives* form the largest group of nursing personnel and, indeed, of all health personnel. Efforts are being made

to determine the responsibilities with which these auxiliary workers can be entrusted and to provide the appropriate training. In the Region of the Americas, a number of seminars were held by the Organization during 1972 to discuss curricula for intensive training courses for nursing auxiliaries. Preliminary results of a survey carried out in the same Region show that, in Argentina, Brazil, British Honduras, Colombia, Cuba, El Salvador, Guatemala, Guyana and Paraguay, more than 280 courses are offered for this type of personnel. In general, however, attempts to improve the training and supervision of auxiliary nurses are hampered by a shortage of qualified teaching and supervisory staff.

10.19 In view of the many categories and levels of nursing personnel, it is desirable that the very large number of persons entering the system at the auxiliary or diploma level should have opportunities of advancement. This aspect is receiving particular attention in WHO-assisted training programmes. In addition, the Organization is carrying out a study on the utilization of the traditional birth attendant in different parts of the world, covering such aspects as legal status, certification and licensing, training and supervision.

10.20 During 1972, WHO assisted in the development of training programmes for various types of *dental auxiliaries* in Ecuador, Guyana, Jamaica, Senegal, Sri Lanka, Sudan, Thailand and Venezuela. As a guide to countries wishing to undertake training programmes for operating dental auxiliaries, the Organization assisted in preparing a curriculum outline for a course at the School for Public Health Dental Assistants in Uganda that can be adapted to local needs and resources.

10.21 WHO health inspectors or sanitarians assigned to 20 projects for the development of basic health services in the African Region are engaged in teaching and administrative work in demonstration zones or at urban teaching centres. In Kenya, a programme of refresher training for *environmental health staff* has been prepared with WHO assistance. In Zaire, an average of 12 health inspectors have been trained each year for the past ten years. The fourth WHO intercountry refresher course for sanitarians in the Eastern Mediterranean Region was held in Damascus.

10.22 The first three-year WHO course for French-speaking level-B *laboratory technicians* at the Training Centre for Health Services Personnel, Lomé, ended in June: the 18 graduates came from the Congo, Dahomey, Gabon and Togo. A refresher course for English-speaking field laboratory assistants was held at the equivalent WHO training centre in Lagos.

Professional health personnel

10.23 In accordance with resolution WHA24.59 of the Twenty-fourth World Health Assembly, the Organization pursued its studies of criteria for assessing the equivalence of medical degrees and diplomas in different countries, in cooperation with UNESCO. To define the respective areas of competence and responsibility of the two Organizations in this field, an intersecretariat consultation was held in Paris in April 1972. In addition, WHO was represented at a UNESCO meeting on the international comparability and equivalence of higher education degrees and diplomas in the western Mediterranean countries, held in Rabat in September. The meeting considered the legal problems involved and the possibility of drawing up an international instrument on the subject.

10.24 WHO working groups met in March and June 1972 to discuss the essential educational features of medical schools and reliable methods of appraising student performance.

10.25 In Romania the Organization provided advice on the development of a centre to assist medical schools in educational planning; and it assisted the Faculty of Medicine of the University of Craiova in defining the objectives of a new Centre for Experimentation in Medical Education. The possibilities were also considered of establishing a central examination system in Romania.

10.26 Further progress was made in the programme for providing low-cost textbooks for students at Latin American medical schools. Eight new titles were published during the year, bringing the total up to 13. A new edition of the textbook on histology was issued, and textbooks on surgery and pathology were selected for immediate publication. More than 110 000 copies of the textbooks in Spanish and Portuguese have been distributed to date; in addition, under a special programme, textbooks in French and in English (15 titles in each language) are being supplied to students in Haiti and Jamaica respectively. An agreement has been signed between the Organization and the Government of Spain for the distribution of textbooks to Spanish medical students from 1973 onwards. Under a further programme, initiated in 1972, low-cost textbooks will also be supplied to nursing students in the Americas. Three books have so far been selected, one dealing with medical-surgical nursing and the other two with maternal and child health.

10.27 A programme for the provision of minimum medical equipment for medical students in Latin America is under study; in a pilot project in Ecuador,

students are being supplied with sets of basic diagnostic tools at cost price.

10.28 During 1972, some 160 WHO-assisted projects for *nursing* education at all levels were in operation in over 90 countries and territories; about 120 were country projects, 30 intercountry projects and 8 inter-regional projects. In most countries, basic nursing education continues to be given through diploma courses. These are generally geared to the needs of the hospital, where the services provided mainly take the form of custodial and acute intensive care and trainees have little opportunity to acquire the skills needed for comprehensive care, whether preventive or curative. This situation restricts exchanges of staff among the various types of nursing service, even though such exchanges are becoming increasingly necessary as the need for different types of health care arises. WHO is therefore encouraging countries to undertake studies of nursing education and to try out curricula designed to give nurses a more comprehensive basic training. This approach means that supervised nursing training should not be restricted to the teaching hospital but should be carried out in the wider setting of the health services as a whole, with special emphasis on community and field work. During 1972, the Organization conducted a preliminary study of the extent to which basic nursing curricula in the Americas take the planning and management of the nursing services into account.

10.29 In the Region of the Americas, following a study of university-based schools of nursing, the Organization has drawn up standards for the development of nursing programmes at university level. In addition, assistance in developing basic nursing education at university level has been given to a number of countries in different parts of the world. For example, advice was given to Iceland on planning an experimental university basic nursing programme, which would make use of a variety of clinical, mental health and community nursing resources in addition to the teaching resources of the State school of nursing.

10.30 During the year, WHO assisted national *malaria* eradication training schools in Ethiopia, Malaysia, the Philippines, Sri Lanka, Sudan and Thailand.

10.31 The Organization gave advice on various aspects of *dental* education to 17 countries in four WHO Regions. A special group meeting on the subject, held in Baghdad in December, was attended by dental educators from the Eastern Mediterranean Region.

10.32 Training schools for *radiologists* were assisted in India, Indonesia, Nigeria, Sudan and Thailand. In cooperation with manufacturers in the Federal Republic of Germany, the Netherlands, and the United Kingdom, WHO-assisted courses on the maintenance and repair of radiological equipment were held for engineering technicians coming mainly from the African and South-East Asia Regions.

10.33 In the African Region, WHO is strengthening the teaching of *public health engineering* in existing courses for civil engineers in Ghana, Kenya and Nigeria. In the South-East Asia Region, the Organization assisted Burma, Indonesia and Thailand in the training of sanitary engineers.

10.34 A *maternal and child health* training project for countries of the African Region is being established in Gabon. During the year, the Organization helped Afghanistan, Cameroon, Indonesia, Sudan and the United Republic of Tanzania to improve their programmes of paediatric and obstetric education. It also advised on a trial curriculum in family health for a number of medical schools in India.

10.35 Training was a prominent feature of WHO-assisted *nutrition* programmes in Burundi, Kenya and Zaire during the year. Training in nutrition was also given to health personnel within the framework of intercountry advisory services in Cameroon, the Central African Republic, Gabon, Togo and Upper Volta. The teaching of nutrition was started in medical schools in Dakar (where a certificate course in applied nutrition was established), Kinshasa and Yaoundé. A seminar on nutrition education for teachers and the staffs of teacher training colleges in the Caribbean area was held in St Lucia in July.

Special training programmes

10.36 The programmes described below include post-basic training, specialization and continuing education; training in public health; and teacher training. In some fields, such as nutrition and health statistics, such programmes often cover a wide range of categories and levels of health workers. Thus, participants in certain seminars and courses (especially refresher courses) may include persons who have not been educated beyond secondary level as well as those in possession of a university degree or other higher qualification.

10.37 *Postbasic training, specialization and continuing education.* The question of *continuing education* for health workers has still not been given the attention it deserves. In a comparative study on the organiza-

tion of continuing education for physicians, completed by WHO in 1972, information was collected on: the extent to which continuing education serves to meet the priority health needs of a country and is integrated in the national health plans and services; the way in which modern pedagogical principles and methods are applied; how far countries encourage or require physicians to continue their studies throughout their lives; and to what extent medical undergraduates are motivated to pursue their studies up to the end of their professional careers. The Central Institute for Advanced Medical Studies in Moscow, which has been designated a WHO collaborating institution for research and the collection of information on post-graduate education, issued four reports on the subject during 1972. These have been widely circulated to Member States, training schools and interested individuals.

10.38 A large number of training courses and seminars in different disciplines was held during the year. They are briefly set out in the following paragraphs.

10.39 The eleventh international training courses in the epidemiology and control of *tuberculosis* were held in Prague (for English-speaking participants) and in Rome (for French-speaking participants); the participants were able to spend four weeks in India, Sri Lanka or Turkey studying all aspects of the national tuberculosis programmes. The seventh in a series of WHO-assisted seminars in advanced techniques for programming in tuberculosis was held at the National Tuberculosis Register, Oslo, and the training of laboratory workers at the BCG Department of the Statens Seruminstitut, Copenhagen, was continued. A five-month tuberculosis control training course was held at the Tuberculosis Research Institute, Tokyo, in cooperation with the Government of Japan. After the course, the participants (from three WHO Regions) were able to study the national tuberculosis control programmes in India and the Republic of Korea. In the Americas, the sixth regional course on the bacteriology of tuberculosis and the third regional course on the epidemiology and control of tuberculosis were held in Caracas, in cooperation with the Ministry of Health of Venezuela.

10.40 In the field of *veterinary public health*, the seventh annual FAO/WHO course for meat inspectors was held in Kenya, with DANIDA cooperation. The Pan American Zoonoses Centre, Buenos Aires, started a second course on animal health planning and collaborated in ten national courses, held in six countries of the Americas, on food microbiology, rabies and the care and management of laboratory animals. A

course for veterinarians working in the national brucellosis campaign was held in Mexico, in cooperation with the Secretariat of Agriculture and the University of Mexico, and a seminar on the public health and animal health significance of brucellosis was held in Havana. In the South-East Asia Region, WHO helped the Indian Government to evaluate the newly established veterinary public health course at the All India Institute of Hygiene and Public Health, Calcutta.

10.41 A consultation of experts was convened in Geneva to advise on the training of malariologists in the light of the revised strategy of *malaria* eradication. The International Malaria Training Centre, Manila, held two general courses for professional staff on the control and eradication of malaria, a course on the parasitology, entomology and epidemiology of malaria for senior technical staff from the South-East Asia, Eastern Mediterranean and Western Pacific Regions, and a course on group educational activity for health administrators and senior rural health workers. A fourth interregional seminar on antilarval operations in malaria programmes was held in Alexandria, Egypt, and the Ethiopian Malaria Training Centre, Nazareth (Adama) gave a refresher course in malaria epidemiology for participants from the African, European and Eastern Mediterranean Regions.

10.42 A course on malacology for persons entrusted with *snail control* or related research was held in Copenhagen, with DANIDA cooperation.

10.43 The fourth advanced training course (lasting six months) in the diagnosis, treatment and prevention of major *cardiovascular diseases* was organized in Copenhagen by WHO in cooperation with DANIDA. A study on the training of the cardiologist in Europe was carried out by the Organization, in close collaboration with the European Society of Cardiology. WHO courses on coronary care and on the rehabilitation of patients with cardiovascular diseases were held in the European Region.

10.44 In the field of *mental health*, a seminar on the teaching of psychiatry in medical schools was organized in Colombo. In Nigeria, a workshop was held on the mental disorders encountered in general practice, and the University of Ibadan received WHO assistance for training undergraduates, postgraduates and auxiliary health workers in mental health. In the Region of the Americas, a study group on the training of psychiatrists was held in Bogotá in June and a programme of continuing education in basic psychiatry for general practitioners was carried out in Brazil, Panama and Paraguay. In the European Region, a

course in French on mental health epidemiology and statistics was held in Paris.

10.45 To encourage the collection of data needed for planning and evaluating *dental care* programmes in the European Region, a course on survey methods for oral conditions was held in London. Three courses on water fluoridation were held by the Organization in Brazil and Venezuela; to date, more than 500 persons have been trained in 20 such courses in nine countries of the Region of the Americas.

10.46 A WHO interregional seminar on the planning, organization and administration of *medical rehabilitation* services was held in New Delhi. Two interregional courses on the training of medical rehabilitation personnel were organized by WHO in Denmark, in cooperation with DANIDA.

10.47 In the Region of the Americas, the Organization supported 61 short intensive courses and six national seminars on sanitary engineering in 1972 and a course on motor vehicle exhaust systems was held in São Paulo, Brazil, as part of a new programme for training personnel for environmental pollution control. In the European Region, assistance was given to international courses for the postgraduate training of *environmental health* personnel in the Netherlands, Poland and Switzerland. Within the framework of UNDP-assisted projects in environmental sanitation for which WHO is the executing agency, seminars were held on air pollution control (Czechoslovakia), water quality management and pollution control (Hungary) and industrial solid waste management (Poland).

10.48 A workshop on medical physics was held in Santiago, and a study group met in Rio de Janeiro to discuss training in physics as applied to *radiation* therapy. Guidelines and detailed curricula were developed by a meeting on the training of medical physicists, held in Kiel, Federal Republic of Germany, with assistance and financial support from the Government. A training course in radiation protection, inspection and supervision, given at Le Vésinet, France, in cooperation with the French Central Protection Service against Ionizing Radiations, was attended mainly by participants from the African and Eastern Mediterranean Regions. As a first step towards improving the training of physicians in radiation medicine, the Organization collaborated with the International Commission on Radiological Education and Information in preparing an inventory of radiological personnel and training systems. A seminar for teachers in radiography was held in

Nairobi by the International Society of Radiographers and Radiological Technicians, with WHO as co-sponsor. In a survey of X-ray equipment in 16 countries of the Eastern Mediterranean Region, it had been found that 65% of the units inspected lacked one or more essential safety features; to help remedy the situation, a training course for medical X-ray inspectors in the Region was held in Nicosia.

10.49 In the African Region, special attention was paid during the year to the training of potential directors of national *occupational health* services, and orientation and refresher courses were developed for all categories of personnel now working in this field. A nine-month course in occupational hygiene for candidates from the South-East Asia, Eastern Mediterranean and Western Pacific Regions started at the Zagreb School of Public Health, Yugoslavia, in September. A joint ILO/WHO conference met in Milan, Italy, in June, to discuss the organization of courses in occupational health and safety.

10.50 Under a new scheme to develop the teaching of the social sciences in schools of medicine in the Region of the Americas, regional centres will be established in Brazil and Venezuela to provide post-graduate training for future teachers of *social medicine*.

10.51 The Organization has continued to help develop and expand postgraduate and advanced programmes of *nursing* education. Of approximately 70 projects of this kind in 1972, 25 were country projects, 20 were intercountry, 8 were interregional and the remainder consisted of fellowship awards. Since 1965, the four WHO-assisted postbasic nursing education centres in the African Region have trained 180 nurse educators and administrators for different branches of nursing. Direct assistance was given to postbasic nursing education programmes at Master's level in India, Poland and the Republic of Korea. A large part of WHO's assistance for the development of postbasic training in nursing and midwifery took the form of educational meetings at the country, regional and interregional levels. A number of short courses in clinical specialties, such as the care of orthopaedic patients and of surgical patients, were assisted by the Organization in South-East Asia. A new educational technique—"sequential learning activity"—with built-in evaluation and follow-up, was developed and tested in a short course on paediatric patient care in Sri Lanka.

10.52 WHO is assisting the postbasic nursing school in Ghana in the teaching of mental health, and a workshop on the integration of mental health concepts into nursing education and practice was held in Ibadan,

Nigeria. Higher education in nursing was the subject of a symposium held at The Hague, Netherlands. Technical guidelines on the teaching of family planning, human reproduction and population dynamics in nursing and midwifery education programmes have been prepared, following a WHO consultation on the subject held in Geneva towards the end of 1971.

10.53 In the field of *health statistics*, the Organization assisted the Indian Council of Medical Research in preparing and conducting a three-week training course on statistical methods in medicine and public health. An interregional travelling seminar on the utilization of statistical information in the planning and evaluation of health services was held in Finland and the USSR. WHO continued to assist the annual courses in medical statistics and epidemiology in Bratislava (Czechoslovakia) and Brussels. In the Eastern Mediterranean Region, a regional seminar on vital and health statistics was held in Damascus. Interregional training workshops for key national health statisticians on the health aspects of population dynamics were held in Bangkok, Bogotá and Teheran.

10.54 In the field of *maternal and child health and population dynamics*, a number of intercountry courses were given in the Region of the Americas: a nine-month course on health and demography (Chile); a 12-month course on the scientific bases for the care of the mother, fetus and newborn, held at the Latin American Centre of Perinatology and Human Development; three-month courses in clinical and social paediatrics (Chile and Colombia); seminars on maternal and child health (Argentina and Chile); and a series of courses on maternal and child health and population dynamics for personnel concerned with nursing education and services in various parts of the Region. Two courses on educational technology as applied to maternal and child health/family planning programmes were held in Central America. A regional training course in human reproduction, family planning and population dynamics was held during April-May in New Delhi. It was attended by senior teachers from departments of paediatrics, obstetrics, gynaecology, and social and preventive medicine in India, Indonesia and Thailand.

10.55 Several interregional, regional and country meetings concerned with training for maternity-centred family planning programmes took place during the year, including a conference on the role of maternal and child health services in family planning in the European Region, with special reference to education and training (Ljubljana, Yugoslavia), and a seminar, jointly sponsored by WHO and the Government of

Iran, on the teaching of maternal and child health/family planning in undergraduate medical schools and nursing institutions (Shiraz, Iran). Seminars on health planning for administrators of maternal and child health/family planning programmes were held in Lahore (Pakistan) and New Delhi. Training seminars on maternity-centred family planning took place in Baghdad, Cairo, Damascus, and Davao City (Philippines). A workshop was held in New Delhi on in-service training in connexion with the integration of maternal and child health services, including family planning, into the general health services. In the Western Pacific Region, an intercountry workshop on the development of education and information materials in family health was organized at Manila.

10.56 In collaboration with UNICEF, WHO has continued to advise and support two interregional programmes of advanced training—one consisting of courses for senior teachers, given at the Institute of Child Health, London, and afterwards at institutions in East Africa and India, and the other of advanced courses in maternal and child health at the National Institute of Mother and Child, Warsaw. UNICEF and WHO have also jointly assisted the American University of Beirut with courses in health, school health, and family health and population dynamics. As part of a programme of postgraduate training in social gynaecology and paediatrics in the European Region, basic information on the subject was collected and analysed during the year. A WHO-assisted diploma course in child health is being provided in Burma at institutes of medicine in Rangoon and Mandalay.

10.57 Technical advisory services were provided in 1972 to the School of Public Health, University of Puerto Rico, for the development of courses leading to a Master's degree in *nutrition*. The WHO-assisted Institution of Nutrition, Federal University of Pernambuco, Recife, Brazil, has established a Master's degree course, lasting 18 months, for students already trained as dietitians. At the Institute of Nutrition of Central America and Panama, Guatemala City, physicians can now take a public health course, leading to a Master's degree, with special emphasis on nutrition and on maternal and child health. The Organization has continued to provide assistance to diploma and certificate courses in nutrition at the National Institute of Nutrition, Hyderabad, India.

10.58 Surveys of current nutrition training programmes and manpower needs in this field have been undertaken in several countries in the Americas and in the Eastern Mediterranean Region. In collaboration

with the International Children's Centre, a WHO course on nutrition in maternal and child health for physicians from African countries where French is spoken was held in Paris and Rabat. Several WHO-assisted training courses in nutrition were given in the Eastern Mediterranean Region, including one on group feeding.

10.59 Assistance for nutrition training was given to various faculties and schools of medicine in Fiji, Pakistan, Papua New Guinea, the Republic of Korea, and Senegal. WHO-assisted nutrition courses were also held for senior public health officers in Burma, and the Organization advised the University of Medical Sciences, Bangkok, on training in nutrition. A five-week intensive public health nutrition course for health service personnel and a seminar on the strengthening of food control measures in the Eastern Mediterranean Region were held in Teheran.

10.60 In India, 20 students fulfilled their academic requirements and started field practice in *health education* under the auspices of a WHO-assisted postgraduate training centre organized by the Central Health Education Bureau of the Ministry of Health and Family Planning and Delhi University.

10.61 *Public health*. In an international comparative study on basic public health training, completed by the Organization in 1972, information was gathered on recent developments and general trends, on the extent to which modern pedagogical methods are being applied and curricula kept up to date, and on the degree of importance attached to such subjects as managerial sciences and techniques, modern epidemiological theory and methods, health economics, operational research, systems analysis and design, medical cybernetics and behavioural sciences.

10.62 Assistance was given by the Organization to a symposium held in Vienna in June with the aim of promoting the postgraduate training of general practitioners and specialists and modernizing the training of medical officers of health; this meeting was linked with the establishment of an Austrian Institute of Public Health. A WHO consultation on postgraduate training in public health, with special reference to the countries of western Europe, met in Copenhagen in March. A new intercountry project was started in the African Region with the aim of strengthening the teaching of public health at both undergraduate and postgraduate levels. Assistance was given to the Institute of Public Health, Dacca, in connexion with the introduction of a postgraduate diploma course. The Organization also advised

schools of public health in a number of countries in different parts of the world on the teaching of the subject at the undergraduate level.

10.63 Other training activities included: a course for senior medical administrators in operational research methods in public health (Aberdeen, United Kingdom); the resumption of WHO assistance to the international course for public health administrators given in Russian at the Central Institute for Advanced Medical Studies, Moscow; the organization by the Pan American Health Planning Centre, Santiago, of basic training courses in health planning in a number of countries of the Americas; the third regional course on national health planning in the South-East Asia Region (Bangkok); the fourth advanced training course on health planning in the European Region (Sweden and the USSR); and the fifth regional training course on national health planning in the Western Pacific Region (Manila).

10.64 *Teacher training.* The development of health manpower continues to be hampered by a shortage of well-qualified teachers. It is important not only to train sufficient numbers of teachers for all categories and levels of health personnel, but also to ensure that their training is of good quality and includes modern educational techniques.

10.65 In the comprehensive WHO long-term training programme for teachers of medical and allied health sciences, selected educational units at universities or medical schools serve as teacher training centres at the interregional, regional and country levels. The teaching personnel who will staff the new regional training centres now being established or developed¹ are being prepared at the interregional teacher training centre set up in 1970 at the Center for Educational Development, University of Illinois College of Medicine, Chicago, USA. In 1972, four key medical teachers completed their one-year course there and four others started it. A group of 27 teachers who will also work in some of the new regional centres attended two four-week seminars at the interregional centre during the year. A two-week seminar—conducted in French—was held in Yaoundé in December for deans and other high-level staff of schools of medicine where regional and national teacher training centres are to be established. A study group on the training and preparation of teachers for schools of medicine and of allied health sciences met in Geneva in October.

¹ In addition to a teacher training centre for the Eastern Mediterranean Region, established in 1972 at the Faculty of Medicine, Pahlavi University, Shiraz, Iran, five other regional teacher training centres are being developed.

10.66 In the African Region, a workshop on medical education methodology for teachers in the health sciences was held in Accra in October and in the same month integrated teaching at the undergraduate level was discussed at a meeting of teachers of health sciences in Brazzaville. In the Region of the Americas, a second workshop on education in the health sciences was held in Washington, D.C., in July-August.

10.67 A training course for medical teachers from the South-East Asia Region was given at Chulalongkorn University, Bangkok, in July.

10.68 A WHO-assisted seminar held in Algiers in November discussed ways and means of introducing modern pedagogical methods into the work of the Faculty of Medicine of the University of Algiers, and a seminar on the training of medical teachers in pedagogy took place in San Remo, Italy, in April. A workshop on the teaching of social and preventive medicine, conducted in English, was held in Edinburgh (United Kingdom) in September for medical teachers from 12 European countries. The establishment of a central teacher training system for physicians in Bulgaria was discussed at a workshop held in Sofia in November.

10.69 In the Western Pacific Region, workshops were held in October to acquaint teachers of various categories of health personnel in Saigon, Seoul and Vientiane with up-to-date educational methods.

10.70 In WHO-assisted programmes for the training of nurse educators, special emphasis has been placed on educational planning and curriculum construction, educational technology, the administration of teaching institutions and research.

Educational technology

10.71 A review of the education and training policies of the Organization was undertaken during 1972 to see how the best possible use might be made of advances in educational technology. A number of fields in which the application of such technology might help to improve health manpower development were singled out and a series of projects planned within each of them.

10.72 A project was started to meet the need for comprehensive reference material in the form of handbooks and manuals for various categories of health auxiliaries in training and in service, as well as material and guides for use by teachers in preparing courses. The aim is to provide developing countries with material in English, French and Spanish that can

10.75 Direct assistance was given by the Organization to seven institutes in connexion with the design, trial and distribution of learning materials for use in developing countries and the provision of suitable facilities for training in educational technology. The problem of the transferability of learning materials between different institutes or countries is being explored. Advice was given to four medical schools in developing countries on establishing or improving medical illustration services. In September, the Government of Brazil and the Federal University of Rio de Janeiro signed an agreement with the Organization for the creation of a Latin American Centre for Educational Technology.

10.76 Though budgetary considerations limit the number of fellowships granted in some of the Regions,

10.77 The search for improved methods for the evaluation of individual fellowships and of the programme as a whole has continued, and in one Region computerization is being tried out as an aid to administration and evaluation.

SENDING GOVERNMENT

Analysis of manpower needs; planning of fellowship allocation; selection of candidates; employment of returning fellows; evaluation

WORLD HEALTH ORGANIZATION

Selection arrangements

Employment arrangements

Choice of study; preparation for fellowship; pursuit of study; reporting on work done; return to service in home country; evaluation

Periodic evaluation of the programme

Placement in receiving country; guidance, financing, administration; evaluation

Study arrangements

Social adjustment

RECEIVING GOVERNMENT

Reception, lodging, social provisions, study programme and supervision; evaluation

WHO 20807

10.79 At a seminar on the planning and evaluation of the fellowships programme in the European Region (Trieste, Italy, in November), problems such as the selection of candidates, language barriers, cultural adjustment and the placement of fellows on their return home were discussed. National selection committees

must consider not only the suitability of each candidate and the relevance of his chosen subject of study to the needs of their health services, but also the relative costs of study in different countries, since a judicious choice can result in substantial savings on fellowship travel and living costs. It is essential to ensure that candidates are reasonably fluent in the language of study before they leave to take up their fellowships. The problem of cultural adjustment often arises, and some receiving countries are making an effort to overcome the homesickness and sense of isolation from which many fellows suffer. The fellow must be placed, on his return, in a job in which full use will be made of his newly acquired knowledge and experience.

10.80 From 1 December 1971 to 30 November 1972, WHO provided assistance to enable 5764 individuals to study abroad. The Organization awarded 3754 fellowships for study, including 402 for undergraduate study, and 2010 fellowships for participants in meetings or other educational activities organized by WHO. Annex 7 summarizes the number of fellowships by subject of study and by Region.

10.81 It is even more important for undergraduate students in medicine and persons undergoing basic training in the allied health sciences than it is for postgraduate fellows that they should study in an environment as similar as possible to that in which they will eventually work. Under a plan initiated by the Organization in 1970, African students who had been awarded WHO fellowships for undergraduate medical studies in the European Region are returning in increasing numbers to complete their training in Africa. As a result of this plan, the number of undergraduate WHO fellows studying in the European Region dropped from 185 in September 1970 to 137 in September 1972, and there were only eight new awards in this category for the academic year 1971-72. Those who have returned include candidates for internship and sixth-year students. The Government of Togo has asked fifth-year Togolese students to return to Lomé to continue their studies at the new medical faculty there.

WHO staff training

10.82 As part of an overall staffing plan, the Organization is re-examining the question of staff training on a long-term basis. Several courses for WHO staff were held in Geneva during the year. A total of 41 medical and other technical officers attended two computer orientation courses given at headquarters

in April and October. In November, senior medical and administrative staff from headquarters and all regional offices attended a one-week seminar in Geneva on the new form of presentation of the programme and budget estimates and on new UNDP operational procedures.

10.83 In the African Region, a nine-month refresher course for WHO laboratory technicians in basic health service projects was completed at the Training Centre for Health Services Personnel in Lomé; a workshop on teaching methodology for WHO nursing tutors was held by the Regional Office for Africa at Brazzaville; and a course was held in October-November at Dakar for WHO staff assisting governments to implement their national health plans or to develop their basic health services. At the Regional Office for the Americas, the orientation and briefing procedures for new staff are being reviewed in depth. In the Eastern Mediterranean Region, training courses were given for WHO representatives and for WHO staff from the Eastern Mediterranean and South-East Asia Regions who deal with family planning in their work. Two-week courses on family planning were also given for WHO staff in the Western Pacific Region.

10.84 A seminar on advanced malaria epidemiology was held at the International Malaria Eradication Training Centre, Manila, for WHO field staff from the Regions of the Americas, South-East Asia, Eastern Mediterranean and Western Pacific.

Library and documentation services

10.85 At its forty-ninth session, the Executive Board completed the organizational study on "Medical literature services to Members".¹ The Board stressed the need for an improvement in medical library services, notably through the development of regional medical libraries, and recommended that an international group of experts should study the role of WHO in relation to present problems of biomedical communications.

10.86 The Medical Literature Analysis and Retrieval System (MEDLARS) centre at WHO headquarters came into operation during the first quarter of the year. The United States National Library of Medicine, Bethesda, Md., USA, supplied the magnetic tapes containing the complete basic MEDLARS data, consisting of nearly 1 3/4 million citations, and the Bio-

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 198, Annex 9.

medical Documentation Centre, Karolinska Institute, Stockholm, provided the programme permitting the tapes to be processed at the International Computer Centre, Geneva. The number of searches processed for inquirers outside WHO has so far been limited, but, by agreement with other MEDLARS centres, the Organization is handling inquiries from biomedical scientists in developing countries.

10.87 At a MEDLARS policy meeting, held in Bethesda in May, the international aspects of the programme were discussed, including collaboration between the Organization and the United States National Library of Medicine in reviewing and revising MEDLARS terminology in the fields of medical education and medical care. A MEDLARS technical workshop, attended by 45 experts from centres outside the USA, was held at WHO headquarters in September. An interregional training course in medical documentation with special reference to family health was held in Geneva in October.

10.88 The number of requests for interlibrary loans received by the PAHO/WHO Regional Library of Medicine, São Paulo, Brazil,¹ almost doubled in 1972 by comparison with the previous year, as did the number of loans that could be processed with the Library's own resources. During the year, the Regional Library started using the MEDLINE system, which makes it possible for a user at a computerized teleprinter terminal to punch a coded request for an abbreviated MEDLARS bibliography and receive it almost instantly from the MEDLINE centre.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraphs 16.142-16.151.

Cooperation with other organizations

10.89 In addition to those listed below, numerous examples of cooperation between WHO and other organizations in health manpower development are given in the preceding pages and in Chapter 13.

10.90 Certain activities of the UNESCO Division of Materials, Methods and Techniques, particularly those concerned with teaching methodology and new approaches to the question of communication in the teaching/learning process, are closely related to the WHO programme in educational technology. An informal interagency committee was set up to hold regular exchanges of views on these activities and to facilitate the most effective deployment and use of staff and consultants. At the request of UNICEF, WHO has undertaken an evaluation of the teaching aids provided by UNICEF to nursing and midwifery schools; revised lists of such aids have been prepared, taking field experience and recent developments in audiovisual media into account. The Organization also cooperated with UNDP and UNESCO in a joint feasibility study on higher education in Morocco.

10.91 The Organization took part, as co-sponsor, in the Fourth World Conference on Medical Education, held by the World Medical Association in Copenhagen in September; the theme was "Educating tomorrow's doctors". WHO is collaborating with the International Confederation of Midwives, the International Federation of Gynecology and Obstetrics and the International Planned Parenthood Federation in a joint study group on the training and practice of midwives and maternity nurses for family planning activities, which met in London in September and in Accra in December.

11. PROPHYLACTIC AND THERAPEUTIC SUBSTANCES

11.1 The discovery and use of powerful and valuable new drugs during recent years has led to nothing less than a revolution in the practice of medicine and the functions of health services in most parts of the world. This powerful new technology, however, has created an unprecedented capacity both to help and to harm, and there is an increasing awareness of the urgent need for regular international exchange of information regarding the assessment of the safety and efficacy of new drugs and on reports of adverse reactions, as well as for an international certification scheme to ensure the desired level of quality of drugs in international commerce. The Organization's work in this field during 1972 has reflected its recognition of the importance of developing a comprehensive approach to this problem, the need for which was stressed in May by the Twenty-fifth World Health Assembly, in its resolution WHA25.61. At a consultation held in September in pursuance of that resolution it was concluded that it might be feasible to develop an international information system to provide Member States with data on the conditions of registration of individual drugs and on the scientific basis of such registration. Once developed, such a system would help to improve the scientific and administrative processes of registering new drugs and would contribute to the preparation of generally acceptable criteria on the quality, safety and efficacy of drugs. It was felt, however, that a feasibility study, limited to new drugs, should first be conducted to make certain that a larger-scale system could be operated successfully.

Drug evaluation and monitoring

11.2 The steady influx of information from governments on their decisions to limit the availability of specific drugs for reasons of insufficient safety or lack of efficacy demonstrated the continued interest in WHO's programme in this field. Twelve new information circulars were issued in 1972, bringing to 109 the total number issued during the 10 years of existence of this service. This provides a procedure by which the attention of government authorities can be drawn promptly to a specific drug or group of drugs that has given rise to concern and action, and interested governments can obtain, from or through WHO,

further information providing them with a valuable insight into the scientific and administrative background of a particular decision. For example, the recent decision of a Member State to withdraw certain halogenated oxyquinolines from the market motivated many national health authorities to evaluate corresponding data relevant to their own territory, and some of them requested dissemination of their own evaluation and decisions through WHO.

11.3 In addition to the technical advice and support provided by WHO to Member States with regard to national drug monitoring centres, both existing and proposed, general recommendations on the organization, functions and responsibilities of such centres were published during the year in the report of the 1971 WHO meeting on the subject.¹ The main purpose of these centres is to investigate causal relationships between reported adverse reactions and drugs as soon after marketing as possible, and to assess their frequency and importance.

11.4 The operational phase of the WHO Drug Monitoring Centre, located in Geneva, has been further developed in accordance with the report submitted by the Director-General to the Twenty-third World Health Assembly.² During 1972, centres in Israel, Japan and Poland began to participate in this project, so that 15 national drug monitoring centres are now actively cooperating in this work. As at 1 November 1972, altogether 38 904 reports of suspected adverse reactions to 2212 different drugs, recorded under nonproprietary names, were included in the WHO Centre's files. The frequency of the different types of adverse reaction reported is illustrated in Fig. 6. A list of these drugs was made available to Member States, and additional information regarding individual drugs was provided on request. Through its drug information circulars WHO was able to alert all Member States in cases of urgency, in accordance with the provisions of resolutions WHA16.36 and WHA23.13.

11.5 Following the development of systems for the recording, processing, linkage and retrieval of reports

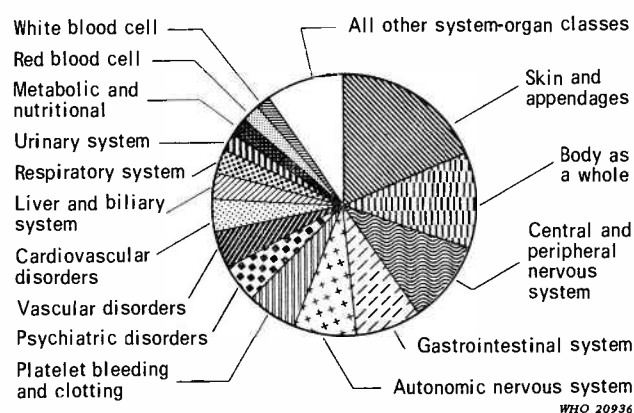
¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 498.

² See *Off. Rec. Wld Hlth Org.*, 1970, No. 184, resolution WHA23.13 and Annex 8.

of adverse reactions, studies were continued, with the collaboration of the participating national centres, on the patterns of drug reactions in different countries and on the occurrence of unusual drug reactions and interactions.

11.6 As part of the medical and scientific investigation of suspected adverse reactions reported to the WHO Drug Monitoring Centre, the WHO-assisted studies for identifying patients receiving certain drugs and determining the pattern of suspected drug-induced diseases were continued; during 1972 they were extended, and intensive hospital monitoring systems in Australia, Czechoslovakia, France, the Netherlands, Poland, and the United Kingdom are now collaborating in this work.

Fig. 6. System-organ class distribution of suspected adverse reactions reported from March 1968 to November 1972^a



^a Based on 75 308 drug reactions reported in 38 904 case reports.

11.7 A study was completed on methods by which data from hospital monitoring systems in Canada, the United Kingdom and the United States of America could be integrated, and a report was made available to national drug monitoring centres. Studies on the correlation between cases of accidental poisoning by therapeutic drugs and adverse reactions to drugs used medicinally were continued at two poison control centres in France.

11.8 One method by which WHO can assist governments in developing the necessary machinery for evaluating the therapeutic safety and efficacy of drugs is the organization of workshops or seminars for public health officials on principles for the preclinical and clinical evaluation of drugs and the surveillance of drugs already on the market. An example was WHO's assistance in the organization of a European symposium on clinical pharmacological evaluation in

drug control, sponsored by the Ministry of Youth, Family Affairs and Health of the Federal Republic of Germany, and held in November in Heidelberg. Participants discussed the organization of, and training in, clinical pharmacology, its role in decisions relating to drug control, and possibilities for its further development.

11.9 Following the Fifth International Congress on Pharmacology, held in San Francisco in July 1972, the Council of the International Union of Pharmacology established a committee for the purpose of strengthening collaboration with WHO.

11.10 The misuse of drugs is giving rise to increasing concern in many countries. However, data on the type and extent of indiscriminate and unjustified drug use are generally inadequate, and a uniform methodology is required in order to facilitate international comparison of studies on drug consumption and its relationship to health services. Investigators from Norway, Sweden and the United Kingdom participating in a WHO-assisted study on the relationship between morbidity and drug consumption met in November in Stockholm to consider ways and means of developing a methodology that can be applied in those three countries to obtain data indicating differences in the consumption of certain drugs; the reasons for such differences can then be studied.

Pharmaceuticals

11.11 In 1971 the Twenty-fourth World Health Assembly, in its resolution WHA24.56, requested the publication of a list of countries where the authorities responsible for the quality control of drugs recognize and implement the requirements for "Good Practices in the Manufacture and Quality Control of Drugs" and a certification scheme on the quality of pharmaceutical products moving in international commerce, as recommended by the Twenty-second World Health Assembly. The information that has now been obtained from Member States indicates that these or equivalent requirements are implemented in several countries. Although national inspection systems are not uniform they are gradually becoming sufficiently similar to allow for mutual recognition by some countries of each other's national inspections on a bilateral or multilateral basis. Several comments have been received from Member States regarding technical and administrative aspects of the certification scheme, which is now under study with a view to revision. So far, the state authorities responsible for the quality control of drugs in the following countries

have indicated that they are giving favourable consideration to the recognition and implementation of these requirements and the certification scheme: Argentina, Australia, Austria, Bahrain, Barbados, Canada, Chile, Cyprus, Czechoslovakia, Denmark, Finland, France, Hungary, Israel, Italy, Madagascar, Malta, the Netherlands, Poland, Portugal, the Republic of Korea, Romania, Singapore, Spain, Sweden, Thailand, the Union of Soviet Socialist Republics, the United Kingdom, and the United States of America.

11.12 Work on the revision of the *International Pharmacopoeia* proceeded in accordance with the recommendations made in 1971 by the WHO Expert Committee on Specifications for Pharmaceutical Preparations.¹ Special attention has been given to general monographs giving comprehensive information on problems which have become of particular interest over recent years—for example, sterilization methods, microbial contamination of non-sterile drugs, quality control specifications for plastic containers, and the determination of foreign particulate matter in solutions for injection. As far as possible these activities, as well as the revision of monographs on individual drugs, are coordinated with the work being carried out on the revision of national pharmacopoeias.

11.13 During 1972 the WHO Centre for Chemical Reference Substances, in Stockholm, made available 15 new chemical reference substances for use in connexion with the WHO programme on quality control specifications for drugs. A total of 57 chemical reference substances is now available.

11.14 The twenty-seventh and twenty-eighth lists of proposed international nonproprietary names for pharmaceutical substances were published in the *WHO Chronicle*.² The lists, containing 71 and 84 names respectively, bring the total of such proposed names to 2963. The twelfth list of recommended international nonproprietary names, consisting of 128 proposed names to which no objection had been filed, or in respect of which objections had been withdrawn, was also published in the *WHO Chronicle*.³ In addition to the third cumulative list of proposed names, comprising all those published in lists 1-25,⁴ computer printouts with alphabetical listing of all names from lists 1-27, together with references to national nonproprietary names, are available to national commit-

tees on nonproprietary names and other interested parties upon request.

11.15 The third interregional course on the quality control of drugs, jointly assisted by DANIDA and WHO, was held in Copenhagen. The four-week course, which was attended by participants from all six WHO Regions, covered principles for the basic training of pharmaceutical analysts, the legislative basis for inspection of pharmaceutical manufacturing firms, the methodology of sampling, and systems of numbering batches and storage techniques.

11.16 In the Region of the Americas the Organization provided advisory services on drug quality control to the Governments of Cuba and El Salvador, to the government representatives at the seventh seminar for food and drug control officials of Central America and Panama, and to technical representatives from the Caribbean countries who met to consider the siting of the proposed Caribbean regional drug testing laboratory. In addition, highly qualified laboratory experts from the United States Food and Drug Administration assisted in the training of analysts at national food and drug testing laboratories in Argentina, Mexico, Panama, and Venezuela.

11.17 Documentation on the WHO programme in the pharmaceutical field and on education of the health team was presented at the Fourth Asian Congress of Pharmaceutical Sciences, held in Bangkok in December. Also in Thailand, WHO assisted in organizing courses for drug analysts and a seminar on the code for good manufacturing practice; the seminar, sponsored by the Druggists Association, was attended by 122 participants. General advice on pharmaceutical and medical stores management was provided to Bangladesh, and the Philippines received WHO's help in the preparation of a report surveying the present situation in relation to pharmaceutical quality control and including details of a proposed five-year programme of assistance for submission to UNDP.

Biological standardization

11.18 The Organization's traditional activities leading to the establishment of international standards and reference preparations for biological substances of importance in prophylactic and therapeutic medicine were continued. The specific work done during 1972 was essentially based on recommendations made by the WHO Expert Committee on Biological Standardization at its meeting in 1971,⁵ as well as on some

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 487.

² *WHO Chronicle*, 1972, 26, 121-139, 414-434.

³ *WHO Chronicle*, 1972, 26, 476-482.

⁴ World Health Organization (1971) *International non-proprietary names for pharmaceutical substances: cumulative list No. 3* (1971), Geneva.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 486.

recommendations made by previous committees on this subject.

11.19 The pharmacological substances under consideration included a number of antibiotics. Information was also collected with regard to certain vitamins and arsenicals that can now be adequately characterized by chemical and physical means, so that biological standards for use in a biological assay system are no longer necessary and could therefore be discontinued. Work on a number of immunological substances, including vaccines and antisera, was continued. The international collaborative assays for all of these standards and reference preparations are being coordinated by the three WHO International Laboratories for Biological Standards in Denmark (Copenhagen) and the United Kingdom (London and Weybridge).

11.20 An important aspect of the programme consists of the formulation and revision of Requirements for Biological Substances which could be used by regulatory agencies as well as by manufacturing establishments and interested workers to maintain a minimum level of efficacy and safety. Current items include the formulation of Requirements for Rabies Vaccine and the revision of certain aspects of existing Requirements for Cholera Vaccine and for Influenza Vaccine.

11.21 A revised draft of the Requirements for the Sterility of Biological Substances was prepared in the light of experience and advances in techniques since 1959, when these were first formulated. The requirements have been extended to cover sterilization processes and considerations of sterility testing which are applicable to all pharmaceutical substances.

11.22 In the programme of research to improve the existing Requirements for Biological Substances, a further laboratory was designated to join the collaborating group of laboratories for research and reference services; there are now seven—in Canada, Czechoslovakia, Denmark, Japan, the Netherlands, the United Kingdom, and Yugoslavia. Reports of studies made at these laboratories, with the collaboration of certain others, on potency assays of pertussis vaccine¹ and diphtheria and tetanus toxoids² have been published in the *Bulletin of the World Health Organization*. These studies are continuing.

11.23 Other studies are being initiated, in conjunction with WHO's virus diseases programme, on yellow fever vaccines. A number of laboratories in various parts of the world are collaborating in these. They are initially intended to develop improved methods of determining the virus content of yellow fever vaccines and thus to achieve better laboratory control of them.

11.24 Efforts were also pursued to develop a service providing characterized microbial cultures and specifications for materials which could be used on an international basis for the sensitivity testing of antibiotics. A prerequisite for the development of such a service is the availability of laboratory facilities so that improved methods of performing these tests can be used, and information is being collected on the scope of relevant activities in various parts of the world.

¹ Murata, R. et al. (1971) *Bull. Wld Hlth Org.*, **44**, 673-687.

² Van Ramshorst, J. D. et al. (1972) *Bull. Wld Hlth Org.*, **46**, 263-276.

12. RESEARCH

12.1 All the operational programmes described earlier in this report necessarily comprise a research element; details of that research are given under the relevant headings in the preceding chapters. In the present chapter, a more general account is given of the coordinated research programme of the Organization and of developments in research in epidemiology and communications science.

Coordination of medical research

12.2 Article 2(n) of the Constitution of WHO states that one of the Organization's functions is "to promote and conduct research in the field of health". The greater part of the research with which WHO is concerned is conducted collaboratively by persons or institutions throughout the world under the coordination of WHO and with some financial support from the Organization. Similarly, support is also given to institutions designated as WHO international or regional references centres, which provide essential international services. The 240 reference centres active in 1972 are listed in Annex 5 (where asterisks denote those designated during the year) along with the 192 officially designated WHO collaborating institutions and laboratories.

12.3 In May the Twenty-fifth World Health Assembly, recognizing, *inter alia*, "that the further success of WHO activities is to a considerable extent dependent on gains in biomedical research and the practical application of its results...", requested in resolution WHA25.60 that the Director-General prepare proposals for the development of long-term WHO activities in biomedical research. As a first step, the WHO Advisory Committee on Medical Research discussed the general implications of that resolution in June; and an interim report on WHO's role in the development and coordination of biomedical research was later prepared for submission to the fifty-first session of the Executive Board in January 1973.

12.4 Nine scientific groups were convened by WHO during the year on the following subjects: application of epidemiological methodology to the health aspects of family planning; evaluation of environmental health programmes; agents stimulating gonadal function in the human; reproductive function in the human

male; cell-mediated immunity and resistance to infection; viral hepatitis; chemotherapy of malaria; pharmacogenetics; relationship between morbidity and population trends; and advances in methods of fertility regulation. These meetings are discussed in the relevant sections of this report.

12.5 The WHO Advisory Committee on Medical Research at its fourteenth session, in June, also reviewed the Organization's programmes concerned with the effects of ionizing and non-ionizing radiation on human health and with comparative medicine and the expanded programme of research, development and research training in human reproduction.

12.6 The committee examined the reports of six scientific groups—on clinical immunology;¹ opiates and their alternates for pain and cough relief;² evaluation and testing of drugs for mutagenicity;³ genetic disorders;⁴ dental caries;⁵ and oral enteric bacterial vaccines.⁶

12.7 On the occasion of this session of the committee, a round-table discussion was held on a number of topics, including the health and social implications of research related to genetic engineering, genetic recombination of infective microorganisms, tumour viruses, and *in vitro* fertilization and subsequent development of human ova.

12.8 Also in June the eleventh meeting of the Advisory Committee on Medical Research of the Pan American Health Organization (PAHO) was held, in Washington, D.C., to review the research programme being carried out in the Region of the Americas.

12.9 Under the WHO research training programme, 73 grants were awarded in 1972 to enable research workers to work abroad and widen their research experience with a view to increasing their contribution to the research activities of their own countries on their return. In addition, 61 grants were awarded to

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 496.

² *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 495.

³ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 482.

⁴ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 497.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 494.

⁶ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 500.

promote the exchange of scientific knowledge by enabling investigators working on subjects of interest to WHO to visit scientists in other countries working in similar or related fields. The research grants awarded for training and exchange are shown, by subject and type of grant, in Annex 6.

12.10 A research and development study of the application of automated instrumentation to major public health programmes of WHO and its Member States has been initiated that incorporates a certain number of studies previously carried out within the epidemiology and communications science programme described in the following paragraphs. Among these ongoing studies, a prototype of the portable health data recorder described in the Annual Report for 1971¹ and developed in collaboration with the Federal Polytechnic School, Lausanne, Switzerland, was tested for several months in simulated field conditions. Another development—also in collaboration with the Federal Polytechnic School²—relates to image processing techniques to be used particularly for the recognition and counting of schistosomal ova in microscope preparations under field conditions. Satisfactory measurements of ova have been made in the laboratory with a simple, inexpensive and fast machine, and it is intended to expand its application to work in other diseases such as tuberculosis, malaria and trypanosomiasis. The possibilities are being explored of developing specialized automated procedures for large-scale serological testing and for the detection and identification of microbial and parasitic agents. The potential uses of remote sensing techniques (e.g., satellites and aircraft) for various epidemiological and environmental studies are also being studied. In parallel with these activities, methodological work to refine the analysis of longitudinal epidemiological data has proceeded, using special computer techniques.

Developments in epidemiology and communications science

12.11 The Organization's programme of research in epidemiology and communications science was reoriented during 1972 to focus the activities within it more closely upon the first of the principal programme objectives (strengthening of health services) approved in resolution WHA24.58 of the Twenty-fourth World Health Assembly for the general programme of work for the period 1973-77.³ By the year's end, the programme consisted of a few large-

scale projects that can, in future years, be integrated into activities for the strengthening of health services. Several are directly connected with health planning and health services development; others are scientific studies of single diseases with well-defined mechanisms or studies of complex multifactorial problems.

12.12 In the programme for comprehensive health planning research in Colombia supported by the Colombian Government, PAHO and WHO, work continued on the detailed analysis of the health system and health planning process in the Department of Valle. A plan was drawn up that divides the broad research activities in this Department into four parts concerned respectively with personal health services for mothers and children, total community health services for mothers and children, personal health services for the total population, and total community health services. In the first phase, which was undertaken late in 1972, the cooperation of some 20 local agencies, both governmental and nongovernmental, was enlisted and a schedule of questions was prepared and tested for the collection of data on the services they provide for mothers and children and the planning procedures they employ.

12.13 These programmes are aimed at helping health services to respond to the changes that follow socio-economic development and technological advance and preventing under-utilization or faulty utilization of such services. To help meet a number of problems of this nature in Iran, the Government of the country, WHO and UNFPA have initiated a three-year project in health services development in one province, West Azerbaijan. The overall objective is to develop and test alternative ways to solve the wide variety of health problems and thus to achieve a more efficient national health system. During the year analytic studies were made of the population and its health status, the health services, and the relationships between health and other sectors. The population studies, which were carried out by questionnaire and physical examinations, covered samples totalling approximately 6000 persons in 12 villages and three urban areas. From the data obtained, a number of alternative patterns of health services will be devised and it is expected that the one selected will be tested and evaluated during a two-year period.

12.14 Preparations have been made to carry out cross-national studies of the different approaches to setting up health services adopted in different Member States. In a first phase, a preliminary framework for this project has been developed and an interview guide and schedule prepared for the gathering of data

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 11.29.

² See also paragraph 4.29.

³ *Off. Rec. Wld Hlth Org.*, 1971, No. 193, Annex 11.

through interviews with key informants and the application of questionnaires.

12.15 Many developing countries are faced with acute problems of how best to allocate scarce resources between preventive and curative services. On the assumption that the systems approach and the use of mathematical models can be useful in suggesting ways to solve such problems, the Organization in 1972 began work on two simulation models, one incorporating the main features of the health situation actually existing in an area of Iran, and the other concerned with important relationships between the health sector and other socioeconomic sectors affecting health.

12.16 Background information obtained in the course of the project on research in health development in the province of West Azerbaijan, Iran, mentioned in paragraph 12.13, was used in developing the simulation model, which includes a dynamic representation of such factors as the incidence rate of certain diseases in different villages, the effects in terms of mortality, morbidity and permanent disability under various levels of treatment, the accessibility of various types of health services, changes in consumer preference for different services, and referrals between services. The model—still at the development stage—currently describes the activities of, at most, ten health service functions in any number of villages with any number of inhabitants. Further investigation is needed to show to what extent it is desirable and feasible to modify it to represent an actual field situation and thus present planners and decision makers with an operational instrument.

12.17 The intersectoral model is constructed to reflect health and other socioeconomic variables such as educational and nutritional levels. The model is a projection of from 5 to 15 years which will simulate some aspects of a region. It is not designed to yield optimal courses of action in the provision of health services, but can be used to examine the implications of undertaking medium- to long-term health programmes, taking into account trends in socioeconomic development. Also, by testing the degree to which errors in the assumptions put into the model affect the conclusions, it will be possible to adjust future data collection activities. The output can be selected in different ways for different users of the intersectoral model. For example, one user may want to examine how infant or childhood mortality changes over time; a second user may want to examine future changes in the birth rate; while a third user may want to study the extent of coverage of the population by the general health services. At present, the model includes a population model, some aspects of organization of

health services in terms of resources and institutions, some aspects of educational and nutritional levels and a simple economic model. Work is continuing to incorporate additional social variables and to refine the model.

12.18 In the study of the methodology of cardiovascular prophylaxis in two contrasting medical care systems—in Rotterdam, Netherlands, and in Kaunas, USSR—the detailed working protocol was completed, field investigations were started at both sites, and some preliminary tabulations and analyses of data from Kaunas were carried out. The method adopted is to use drug treatment of a sample population to alter three risk factors influencing myocardial infarction and cerebral stroke—namely, elevated blood pressure, serum cholesterol level, and impaired glucose tolerance. Problems relating to the operation of this health intervention programme and to the behaviour of the persons concerned will also be investigated. The target population is 4000 men, 45-49 years of age, at each site. In the course of the baseline survey and the screening examinations in Kaunas, approximately 2500 men were contacted and about 1000 screened. In Rotterdam, in a shorter period of operations, about 1500 men were contacted and approximately 500 screened. An inquiry into the initial attitudes and practices of local physicians with regard to the purpose and conduct of the study was carried out at each site, and a similar inquiry will be made at the conclusion of the study. A preliminary mathematical model for the analysis of the cost/effectiveness of population-based activities for intervention in chronic diseases has been prepared.

12.19 As social and economic development proceeds, populations are exposed to the risk of a greater variety of disabling accidents, injuries and chronic diseases. WHO has accordingly designed a project to assess the prevalence of disability in the productive age, its causes and the social and environmental factors associated with it. The study is being carried out in Belgrade, in collaboration with the Federal Institute of Public Health of Yugoslavia. Using data from the 1971 census, a sample of approximately 10 000 persons aged 35-54 years from diverse socioeconomic backgrounds has been selected from both rural and urban areas in one commune of Belgrade. These people will be interviewed in their homes in order to determine who among them is currently disabled; it is estimated that about 1000 disabled individuals will be found in this area. The interview schedule and the elements of the detailed examination have been developed and pretested by the WHO team and the local collaborators. Those found to be disabled will be invited

to undergo a detailed examination in order to determine the degree and causes of disability as well as the social and environmental factors associated with the disability; 1000 persons not disabled will be given a similar examination for comparison.

12.20 In 1972, the Organization's programme of scientific studies of single diseases was again focused on malaria and schistosomiasis. The research project on schistosomiasis in man-made lakes is described in paragraph 2.44.

12.21 Investigations into the epidemiology and control of malaria in the African savanna were continued in 1972 (see also paragraph 2.30). One objective of the project is to make a quantitative and integrated study of the epidemiology of malaria in the African savanna both before and after the introduction of control measures. The study also affords an opportunity to evaluate the usefulness of immunological tests as new epidemiological tools. Data are also collected from control villages. A second objective is to build a new mathematical model of malaria transmission.¹ After 18 months of work, the collection of baseline data has been completed; these are being analysed and used to test the new transmission model.

12.22 The projects undertaken in Iran and Switzerland to study the transmission of certain infections to man through animals have been completed. The data collected in Iran during the years 1969-71 on the ecology and the geographical distribution of mammals that act as reservoirs of human disease were evaluated and maps of the distribution of reservoirs and the density of vector species were produced. Several of the computer programmes developed in this project were modified for use in the comprehensive health planning research project in Colombia and other studies. During 1972, the geographical distribution of rodent-borne and bat-borne rickettsial and arboviral infections was also mapped. Small mammals in Iran were found to harbour *Coxiella burneti* (10.5%), *Rickettsia prowazeki* (3.3%), *R. sibericus* (2.2%) and

R. tsutsugamushi (3%). Approximately 10% of the wild rodents sampled showed antibodies to rickettsiae. Among the arbovirus infections observed were West Nile virus in bats, rodents, lagomorphs and insectivores, Crimean haemorrhagic fever virus in lagomorphs and rodents, and Russian spring-summer encephalitis virus in insectivores, bats and rodents. The geographical analysis of the distribution of specific rickettsial and viral agents did not reveal any regionalization, such as was noted in the animal species that act as reservoirs.

12.23 Fifty species of fleas on as many mammal species were determined and the corresponding indices calculated. A focus of wild rodent plague was discovered in West Azerbaijan. In contrast to what would normally be found in domestic animal populations, *Salmonella* and *Shigella* were observed in only a few wild mammals, and antibodies to leptospirosis were observed in only one of the 1500 mammals sampled for the purpose. Rabies was not found in any of the nearly 450 bats sampled.

12.24 The data collected in the Canton of Vaud, Switzerland, during the years 1970-71 were analysed and used to compare various formulae for calculating the densities of small mammal populations and to determine what were the simplest and most accurate sampling methods. The examination of data on over 1000 rodents, each captured and recaptured an average of 4.5 times, showed that patterns of seasonal density and reproductive rates are easy to calculate, but also that the prevailing ideas of movement patterns are not adequate to explain the observed distributions in space and in time. Computer simulations demonstrate that over short periods the movement patterns of these mammals are determinative and over longer periods they approach randomness. These results, based on observations throughout the year, indicate the need for prior biological information when the sampling of small mammals for epidemiological purposes is required. Such information is specially important when designing ecological surveys in connexion with rickettsioses, arboviruses or infections of unknown etiology suspected to be rodent-borne.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, paragraph 11.16.

13. COOPERATION WITH OTHER ORGANIZATIONS

13.1 The Organization participated in a series of interagency and intersecretariat activities during 1972 in preparation for the first biennial review of the implementation of the International Development Strategy for the Second United Nations Development Decade. The Economic and Social Council's Committee on Review and Appraisal, established in 1971, held its organizational meeting, and the Administrative Committee on Co-ordination (ACC) made arrangements for all the specialized agencies and organizations of the United Nations system to submit baseline data on the situation in the various sectors at the beginning of the Decade, in 1971. These data—and others, to be systematically collected—will provide the basis for the mid-term review and appraisal scheduled for 1975. WHO's contribution reviewed the situation in 1971 with regard to health problems, the availability of health services, and health manpower. The Organization also made arrangements to obtain from governments the information required for future appraisals; the use of the questionnaire for the preparation of the Fifth Report on the World Health Situation (1969-72) will be one of the means of obtaining the data.

13.2 WHO made a considerable contribution to the preparations for the United Nations Conference on the Human Environment, held in Stockholm in June. It provided six basic papers as background information for the preparation of the position papers and action proposals at the Conference, collaborated with members of the United Nations system regarding other papers, and provided comments and technical advice on many of the conference documents. The Organization provided technical expertise as required to the Conference secretariat, seconded a staff member to serve on the secretariat, and played an active part in the conference arrangements. In a statement to the Conference the Director-General outlined the primary concerns of the Organization in environmental matters. The action plan for the human environment adopted by the Conference and subsequently approved by the United Nations General Assembly set forth more than one hundred recommendations; some 22 of these are of direct concern to WHO, and a further 21 are also of interest. The Organization will be represented on the Environmental Co-ordinating Board which is to be established within the framework of ACC. The functions assigned to the Governing Council for

Environmental Programmes and the environment secretariat are to be exercised within the context of the principles of collaboration and coordination reflected in the relationship agreements between the United Nations and each of the specialized agencies and IAEA.

13.3 The Economic and Social Council started a series of in-depth reviews of the work of individual agencies, and examined in 1972 the work of WMO and WHO. The Director-General described WHO's constitutionally decentralized structure, the various areas of work developed and expanded in accordance with priorities set by the World Health Assembly, and the four principal areas of global priority set forth in the Fifth General Programme of Work, 1973-77. It was generally agreed that the new procedure of full discussion assisted the Council in carrying out its coordination functions.

13.4 The Organization assisted in the preparation of regional plans of action being drawn up by the Advisory Committee on the Application of Science and Technology to Development (ACAST) with the cooperation of ECA, ECAFE, ECLA and UNESOB. At its fifty-third session, in July, the Economic and Social Council requested the regional economic commissions, in consultation with the specialized agencies concerned, to consider the regional plans of action with a view to commending them to governments in the formulation of national policies in the field of science and technology. It also requested its newly established Committee on Science and Technology for Development and ACAST—in both of which WHO participates—to keep the World Plan of Action under continuing review. WHO brought the World Plan of Action to the attention of ministries of health and intergovernmental and nongovernmental organizations in official relations.

13.5 WHO has developed a close working relationship with the Office of the Disaster Relief Co-ordinator since its establishment in March 1972 in Geneva in accordance with a decision of the United Nations General Assembly. Assistance was provided in a number of disasters, particularly in the Philippines (see paragraph 15.48) and, late in the year, in Nicaragua. The Secretary-General designated the Office of the United Nations High Commissioner for Refugees

as the focal point for interagency assistance in the repatriation, rehabilitation and resettlement of Sudanese refugees and displaced persons returning to southern Sudan; the Organization cooperated fully in this effort, particularly in the provision of medical supplies.

13.6 With regard to population questions, the Economic and Social Council approved in principle the draft programme and arrangements for the World Population Conference to take place in 1974, designated as World Population Year, and invited the Secretary-General for the Conference and the Year to draw upon the expertise and competence of the specialized agencies. WHO has taken part in the preparations for this Conference. The Organization also continued to maintain close collaboration with the United Nations Fund for Population Activities (see Chapter 9). ACC reported to the Council its agreement on guidelines to assure a common approach on the part of all organizations concerned in order to meet the needs of the increasing number of developing countries desiring extended family planning services to reach progressively the greater part of their population. These guidelines indicated, *inter alia*, that the general health services, in particular the maternal and child health services, should remain the principal channel for the implementation of family planning programmes.

13.7 Regarding drug dependence, the Council invited the United Nations Secretary-General, WHO, and all competent institutions to coordinate and promote research on cannabis, and to concentrate in particular on the problem of multiple drug-abuse; it also recommended that WHO carry out further studies on khat (see also paragraph 4.110). WHO continued to cooperate with the United Nations Fund for Drug Abuse Control.

13.8 WHO's proposed programme and budget estimates for 1973 were circulated in December 1971 to the United Nations and organizations of the United Nations system at the same time as they were transmitted to Member States of the Organization, and the comments received were submitted to the WHO Executive Board and later to the World Health Assembly. Increased emphasis was laid on consultations between WHO and other agencies as a means of ensuring advanced planning of joint programme activities, and consultations on current programmes of mutual concern were held during the year.

13.9 The Organization's cooperation with the United Nations regional economic commissions and UNESOB was intensified during the year (see paragraphs 13.56-

13.60), particularly, in relation to the Second United Nations Development Decade, the regional plans of action in science and technology, population and social questions, and statistics.

United Nations Development Programme

13.10 At its thirteenth session, held in New York in January 1972, the UNDP Governing Council considered the first series of country programmes submitted under the new procedures initiated by virtue of the Consensus,¹ and an assessment of the experience gained in this new exercise. It formally approved the 19 country programmes submitted to it, and approved 118 projects (12 of them for supplementary assistance) requested by countries that had not then undertaken their country programming exercises; they will in due course be included in the country programmes when these are presented for approval. WHO is the executing agency for 9 of these projects (Table 4). In addition, 45 regional and 15 interregional ongoing projects were approved, 12 of the former and 5 of the latter having been entrusted to WHO.

13.11 At its fourteenth session, held in Geneva in June, the Governing Council approved country programmes for 16 countries. WHO commented on most of these programmes to UNDP, and also continued its review of the 24 draft country programmes to be presented to the January 1973 session of the Council.

13.12 Some 115 large-scale projects were approved directly by the Administrator, in accordance with the authority granted to him by the Council. Among these were 10 for which WHO was designated as executing agency (Table 4). This brings to 75 the number of large-scale projects so far entrusted to WHO for execution, with a total UNDP contribution of approximately US \$62.5 million.

13.13 At both the thirteenth and fourteenth sessions of the Council considerable attention was given to the question of providing additional assistance to the least developed among the developing countries. The discussion in June reflected the recommendation adopted the previous month by the United Nations Conference on Trade and Development, and the Council finally approved the allocation of additional resources totalling US \$55.8 million for the period 1972-76 for special measures in favour of the 25 countries identified as being the least developed, as well as for other countries that might possibly be added to the list.

¹ See *Off. Rec. Wld Hlth Org.*, 1971, No. 193, resolution WHA24.52 and Annex 8.

13.14 At the meetings of the Inter-Agency Consultative Board and its Programme Working Group, held in London (April) and in New York (October), it was agreed that the short time allowed for the first country programming exercises had been the greatest difficulty encountered, and suggestions were made to accelerate the preparations for the exercises due for submission to the 1973 and 1974 sessions of the Council. The importance of agency briefs and of sectoral studies in relation to the preparation of background documents was stressed. Criteria for the evaluation of ongoing projects were outlined, and procedures for periodic reviews of country programmes were discussed.

13.15 During 1972 project documents (or "plans of operation" that were being drafted in 1971) were signed for 11 large-scale projects entrusted to WHO for execution (see Table 4), and were under preparation for all the interregional and regional projects planned for 1973 and subsequent years, as well as for 55 large-scale country projects.

13.16 WHO organized or participated in a number of UNDP preparatory assistance missions, often in collaboration with other agencies, to assist governments with preparations for large-scale projects. Reference is made in paragraphs 2.63-2.64 to the work of the preparatory assistance mission regarding the onchocerciasis control project in the Volta River basin. In addition, preparatory assistance was approved for, or provided to, Algeria, Bahrain, Burma, Ethiopia, Gambia, Greece, Ivory Coast, Khmer Republic, Lebanon, Malaysia, Poland, Sudan, Syrian Arab Republic, Venezuela and Yugoslavia. A WHO planning mission discussed with the East African Community and the authorities of Kenya, Uganda and the United Republic of Tanzania the possibilities of intensifying research on trypanosomiasis, and a joint UNDP/ILO/WHO mission visited Bulgaria to review the electronic data processing aspects of the UNDP/WHO project for a scientific centre for hygiene and epidemiology.

13.17 Terminal reports on large-scale projects submitted to UNDP during the year included those on the Institute of Sanitary Engineering in Rio de Janeiro, Brazil; water supply and sewerage for the Accra-Tema metropolitan area, Ghana (supplementary project); wastes disposal and drainage for Ibadan, Nigeria (phase I); protection of river waters against pollution in Poland; public water supply, drainage and sewerage for the south-west coastal area of Sri Lanka; master plans for water supply and sewerage for the Istanbul region in Turkey, and for the Greater Kampala and Jinja areas in Uganda; and maintenance and engineering of health care facilities in Venezuela.

Table 4. Procedural action during 1972 on UNDP-assisted projects for which WHO is executing agency

1. New projects approved during 1972 by UNDP Governing Council or the Administrator

Afghanistan	Strengthening of the Planning Board of the Ministry of Health
Afghanistan	Nursing Advisory Services
Afghanistan	Tuberculosis Advisory Services
Argentina	Centre for Utilization of Computers in Health Programmes
Chile	Bacteriological Institute, Santiago
Gabon	Treatment, Drainage and Disposal of Liquid and Solid Wastes, Libreville
Guyana	Development of Potable Water Supply, Sanitary Sewerage and Storm Drainage
Hungary	Establishment of Pilot Zones for Water Quality Management
Iraq	Comprehensive Basic Health Services Training
Niger	National School of Public Health, Niamey (Phase II)
Poland	Environmental Pollution Abatement Centre, Katowice
Sudan	National Health Laboratory Service
Uruguay	Development of Nursing Services
Uruguay	Medical Services and Hospital Administration
Venezuela	National System for Maintenance and Engineering of Health Care Facilities
Yemen	Institute of Health Manpower, Sana'a
Yugoslavia	Community Water Supply, Waste Disposal and Pollution Control, Kosovo
Zambia	Development of Basic Health Services
Regional	Pan American Zoonoses Centre

2. Large-scale projects for which project documents were signed during 1972

Afghanistan	Water Supply, Sewerage and Drainage for Greater Kabul
Algeria	National Water Supply Authority
Cameroon	University Centre for Health Sciences, Yaoundé, Phase II
Cuba	Strengthening the National Institute of Hygiene, Epidemiology and Microbiology
Democratic Yemen	Institute for Health Manpower Development, Aden
Iraq	Rural Water Supply Programme
Kenya	Sewerage and Groundwater Supply, Nairobi
Mali	Study of a Drainage System for Bamako and Water Supply for Selected Provincial Towns
Romania	Assistance in Water and Air Pollution Control, Phase II
Venezuela	National System for Maintenance of Health Care Centres
Interregional	Research on the Epidemiology and Methodology of Schistosomiasis Control in Man-made Lakes

13.18 WHO continued to review requests submitted by governments for UNDP assistance, advising on the health implications. The Organization reviewed some 60 requests during 1972 and proposed its participation—or was called upon to participate—in a number of projects being executed by other agencies. During 1972 agreements reached with the United Nations, ILO and FAO provided for the transfer to WHO of some 166 man-months to cover the assignment of health specialists in 15 projects, and WHO provided assistance in various fields, including public health administration, epidemiological surveys, the development of health manpower, sanitary engineering, biology and medical entomology, and the control of biotoxins. The Organization is also cooperating with the Asian Development Bank, the executing agency for the UNDP-financed Laguna Lake Development Authority project, near Manila.

13.19 Similarly, some of the UNDP projects for which WHO is executing agency were assisted by the United Nations (hydrology, cartography and drilling), ILO (mine safety, computer techniques, and labour protection), and FAO (soil surveys, agricultural economics, veterinary services, and social and ethnological aspects). As an example of effective inter-agency collaboration during the year may be cited the cooperation between ECAFE, the Mekong Committee and WHO in the Lower Mekong River Basin project.

13.20 UNDP support to the WHO interregional projects for the provision of consultant services in pre-investment planning and the organization of annual travelling seminars in the USSR was discontinued, and the research project on the epidemiology and methodology of schistosomiasis control in man-made lakes (currently working on Lake Volta in Ghana) had to be reduced in scope because it was not possible to obtain the necessary additional funds.

13.21 Projects financed from UNDP sources are shown in Part III of this Annual Report, and a more detailed account of UNDP-financed projects in the field of water supply and wastes disposal is given in Chapter 6.

United Nations Children's Fund

13.22 At its nineteenth session, held in Geneva in February 1972, the UNICEF/WHO Joint Committee on Health Policy¹ carried out a detailed review of trachoma programmes assisted by the two organizations from 1948 to 1970 (see also paragraph 1.75).

It was recognized that, although international assistance in this field had contributed to the noticeable progress made in trachoma control during that period, the disease was still a serious public health problem in countries ill-equipped to deal with it. It was recommended that, in countries where basic health services were being developed, steps should be taken for the gradual integration of activities for the control of trachoma and related eye infections into the routine work of these services. A number of specific recommendations were made regarding future UNICEF and WHO assistance in this field (including the provision of technical guidance and of supplies and equipment) and action to be taken by governments of countries where trachoma is still endemic.

13.23 The Joint Committee also reviewed the family planning aspects of family health, with special reference to UNICEF/WHO assistance (see also paragraph 9.13). In many of the developing countries, women of child-bearing age and children constitute 70% of the population, and this vulnerable group should clearly be given priority in family health care. Family health problems arising directly from the processes of human reproduction, growth and development, as they affect mothers and children, were discussed. The Joint Committee concluded that, as an integral part of family health care, family planning activities demand the full attention of the health services, and it approved a number of detailed recommendations on ways in which both UNICEF and WHO can cooperate in assisting countries in this field.

13.24 UNICEF and WHO programmes for advanced training in maternal and child health, obstetrics and paediatrics were reviewed. It was considered that every attempt should be made to introduce the fundamental principles of maternal and child health and family planning into the basic curricula for all levels of personnel. The participation of the two organizations in programmes concerned with innovations in medical education was stressed, particularly in connexion with the adoption of community-oriented and integrated programmes.

13.25 Following an exchange of views on onchocerciasis control programmes, the Joint Committee considered that the UNICEF contribution should be mainly in the form of assistance (including the provision of drug supplies) to the development of basic health services in areas where the disease is still endemic. Recommendations were also made for action against xerophthalmia.

13.26 At its twenty-sixth session, held in New York in April-May, the Executive Board of UNICEF examined a number of policy matters, including

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 203, Annex 2.

UNICEF's role in assistance to socioeconomic development, and endorsed new guidelines on UNICEF aid to education which have implications for health programmes for school-age children and youth. It was considered that nutrition and health, particularly maternal and child health, should be given the highest priority in connexion with socioeconomic development. An increase in the aid provided to the least developed among the developing countries was advocated, and it was urged that control programmes should concentrate on children in the less privileged population groups and, in particular, on younger children. The Board formally approved the recommendations made in the report of the Joint Committee on Health Policy. Programme allocations of US \$46.2 million were approved, about 43% being in respect of health services.

13.27 Close collaboration between members of the two secretariats was maintained at all levels, and WHO was represented at the UNICEF programme review meetings held during the year.

United Nations Relief and Works Agency for Palestine Refugees in the Near East

13.28 WHO continued to support the UNRWA health programme, providing the services of the Agency's Director of Health and four other health specialists. In accordance with the request of the Twenty-fifth World Health Assembly in its resolution WHA25.54 regarding health assistance to refugees and displaced persons in the Middle East, the Director-General brought that resolution to the attention of all governmental and nongovernmental organizations concerned, including international medical organizations.

13.29 Despite serious budgetary difficulties, the fundamental task of preserving the health of the refugee population, through a comprehensive community health service based primarily on direct family care and environmental sanitation, continued to be carried out with a fair measure of success. The outpatient services originally intended for Palestine refugees registered with UNRWA as eligible for health services have been extended, as a temporary measure, to persons and families from the Gaza Strip and the west bank of the River Jordan who are living in emergency camps to the east of the Jordan. Vigilance was maintained against a possible recrudescence of cholera, and routine measures against other diseases were continued. No cases of cholera, plague, yellow fever, smallpox, louse-borne or endemic typhus or relapsing fever were reported during the year.

World Food Programme

13.30 By the end of 1972, the World Food Programme had been in operation for almost ten years. During that period, voluntary contributions in commodities and services from participating States permitted support to be given to some 530 development or relief projects in more than 80 countries. Out of total commitments of US \$1 083 160 000 as at 1 September 1972, US \$87 802 000 were allotted to health-promoting projects, and most of the other projects have at least an indirect bearing on health.

13.31 Over the period of a year up to 1 September 1972, 70 World Food Programme projects—57 of them entirely new—were submitted to WHO for technical scrutiny of their health implications. Interim evaluation missions, in which the Organization took part, examined several of the major health-promoting projects and recommended their continuation. These included the largest of all the projects supported by the Programme, namely, the national programme of nutrition and supplementary feeding in Colombia, for which FAO, UNICEF, UNESCO and WHO all supplied technical aid.

13.32 In Egypt, part of the savings resulting from World Food Programme assistance to an agricultural development project is being used to help establish ten new health centres.

Nongovernmental organizations

13.33 A report on the triennial review of international nongovernmental organizations in official relations with WHO, covering the period 1969-71,¹ was submitted to the Executive Board at its forty-ninth session, in January 1972. The Board noted that, during the period under review, cooperation had been mutually fruitful with nearly all the organizations concerned, but decided to suspend official relations with three of them until such time as working relations demonstrated mutual interest in resuming official relations.

13.34 In addition, the Board decided to establish official relations with the following organizations: the International Association on Water Pollution Research, the International Committee on Laboratory Animals, the International Ergonomics Association, the International Federation for Information Processing, the International Federation of Ophthalmological Societies, the International Union for

¹ *Off. Rec. Wld Hlth Org.*, 1972, No. 198, p. 94.

Conservation of Nature and Natural Resources, the International Union of Immunological Societies, the World Federation of Neurosurgical Societies, and the World Federation of Parasitologists. This brought the number of nongovernmental organizations in official relations with WHO to 98 (see Annex 10).

13.35 The cooperative activities with nongovernmental organizations in official or working relations with WHO are described throughout this volume; the following selected examples indicate the wide range of mutually beneficial collaboration:

- cooperation with the League of Red Cross Societies in connexion with emergency and relief operations;
- cooperation with the International Union against Tuberculosis, particularly in the operation of the International Tuberculosis Surveillance Centre, jointly sponsored by the Union, the Organization for Health Research in the Netherlands, and WHO;
- co-sponsorship of the Fourth World Conference on Medical Education convened by the World Medical Association;
- collaboration with the International Confederation of Midwives, the International Federation of Gynecology and Obstetrics and the International Planned Parenthood Federation in a joint study group on the training and practice of midwives and maternity nurses for family planning activities;
- cooperation with the International Society of

Cardiology and its regional bodies with regard to research, as well as in the promotion of various activities in connexion with World Health Day 1972, the theme of which was "Your Heart is your Health";

- collaboration with the International Brain Research Organization on nutritional and environmental matters affecting brain maturation and mental development;
- co-sponsorship of a seminar for teachers in radiography with the International Society of Radiographers and Radiological Technicians;
- collaboration with the International Commission on Radiation Units and Measurements in the preparation of published recommendations on measurement of low-level radiation;
- cooperation with the Council for International Organizations of Medical Sciences in connexion with workshops to discuss draft nomenclatures of diseases of the blood and blood-forming organs and infectious and parasitic diseases; a meeting of experts to consider draft proposals for a nomenclature of diseases of the gastrointestinal tract; a round-table conference on recent progress in biology and medicine, and its social and ethical implications;
- participation in the fourth international congress on traffic medicine of the International Association for Accident and Traffic Medicine.

SUMMARY OF COOPERATION WITH OTHER ORGANIZATIONS

13.36 The following illustrative list of cooperative activities and meetings in which WHO participated summarizes the main fields of collaboration during the year between WHO and other organizations, apart from the cooperation referred to above with UNDP, UNICEF, UNRWA, the World Food Programme and nongovernmental organizations. More detailed examples of cooperation are to be found in the various chapters of this volume.

United Nations and related agencies

United Nations

13.37 Economic and social development: first organizational session of the Economic and Social Council's Committee on Review and Appraisal; eighth session of the Council's Committee for Development Planning; ACC Sub-Committee on the Second United Nations Development Decade; United Nations expert group on methods of determining standards for planning and policy making in the social sectors; United Nations interregional seminar on organization and administration of development planning agencies; ACC interagency study group on evaluation; cooperation with the United Nations in correspondence course on social planning, including preparation of lectures on health planning; first session of the Economic and Social Council's Committee on Crime Prevention and Control; United Nations

expert group meeting to discuss the report on a unified approach to development analysis and planning; United Nations interregional workshop for directors of centres engaged in research and training in regional development.

13.38 Environmental health: Preparatory Committee for the United Nations Conference on the Human Environment; post-conference meeting of experts to consider further the setting-up of an international referral service for sources of environmental information; ACC *ad hoc* meeting of the working group on hydrology; ACC Sub-Committee on Marine Science and its Applications.

13.39 Housing and urban planning: collaboration with the United Nations Centre for Housing, Building and Planning.

13.40 Lower Mekong Basin development programme: provision of advice on public health aspects of the programme, and representation at plenary meetings of the Mekong Committee.

13.41 Statistics: seventeenth session of the Statistical Commission and fourth session of its working group on international statistical programmes and coordination; United Nations working group on social demography; ACC Sub-Committee on Statistical Activities; ACC *ad hoc* meeting and interagency working group on demographic projections; coordination with

the United Nations and other members of the system with a view to bringing together all health-related statistical information; co-sponsorship with the United Nations of an interregional seminar on mortality analysis; joint United Nations/WHO study on fetal, infant and childhood mortality.

13.42 Dependence-producing drugs: collaboration with the Commission on Narcotic Drugs, the International Narcotics Control Board and the United Nations Fund for Drug Abuse Control; conference of plenipotentiaries to consider amendments to the Single Convention on Narcotic Drugs; United Nations meeting to discuss a proposed project for an interdisciplinary abstract journal on drug dependence and its treatment; cooperation in development of a comprehensive programme to control drug dependence in Thailand (see paragraph 4.108).

13.43 Population activities, including family planning: continued cooperation with the United Nations including UNFPA, and other agencies concerned; ACC Sub-Committee on Population; special session of the Population Commission; third session of the Preparatory Committee for the World Population Conference; sessions of the United Nations inter-agency working group on finances and coordination of UNFPA-supported activities for World Population Year; meeting of United Nations Advisory Committee of Experts on Global Population Strategy; United Nations seminar on the management of family planning delivery systems at the local level; United Nations interregional seminar on the status of women and family planning; UNFPA symposium on neonatology; UNFPA interagency consultative committee; United Nations interregional workshop on population action programmes with special reference to the fertility component of rapid population growth; participation in country missions (for example, United Nations/UNESCO/WHO family planning mission to Sri Lanka).

13.44 Transport, tourism and communications: ACC *ad hoc* meeting on tourism; United Nations Committee of Experts on the Transport of Dangerous Goods.

13.45 Effects of atomic radiation: provision of information to the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and participation in its twenty-second session.

13.46 Youth: the preparation of a chapter on the health needs of youth for the United Nations report "Youth: their needs and aspirations"; participation in ACC *ad hoc* interagency meeting on youth, in informal meetings of nongovernmental organizations convened by the United Nations, and in UNICEF interministerial conference for Africa on the subject of children and youth and development plans.

13.47 Women: cooperation with the Commission on the Status of Women and provision of assistance in connexion with a study on the status of women and family planning; United Nations interregional meeting of experts on the integration of women in development; UNITAR colloquium on the situation of women in the United Nations; United Nations interregional seminar on the status of women and family planning.

13.48 Education and training: representation at meeting of United Nations Panel of Experts on the Establishment of an International University; briefing sessions on WHO activities for the ninth graduate study programme organized by the United Nations in Geneva. (See also paragraph 13.63.)

13.49 Human rights: United Nations interregional seminar on human rights and scientific and technological developments; cooperation with the Commission on Human Rights in connexion

with a study of human rights in the light of scientific and technological progress.

13.50 Mental health: cooperation with the United Nations Social Defence Research Institute, including preparation of a protocol for the study of mentally abnormal offenders in different countries; establishment of a joint standing committee of the Institute and WHO to plan complementary programmes; participation of the Institute in WHO regional working group on problems of deviant social behaviour in adolescents and young adults.

13.51 Science and technology: participation in sixteenth and seventeenth sessions of ACAST, and in meetings of its regional groups for Africa, Asia and the Far East, and Latin America, and a UNESOB meeting of experts, to discuss regional plans in connexion with the ACAST World Plan of Action.

13.52 Natural resources: second session of the Economic and Social Council's Committee on Natural Resources; ACC Sub-Committee on Water Resources Development; ACC *ad hoc* interagency meeting on natural resources; meeting between specialized agencies to consider the implications of the proposed United Nations water conference, and a United Nations intergovernmental panel of specialists to prepare a draft agenda and organizational proposals for the conference; United Nations Committee on the Peaceful Uses of the Sea-bed.

13.53 Public information: cooperation with the Programme Committee of the Centre for Economic and Social Information, and with the ACC Consultative Committee on Public Information.

13.54 Disarmament and related questions: cooperation with the United Nations group of experts on napalm and other incendiary weapons and all aspects of their possible use, and with the group of experts on the economic and social consequences of disarmament.

13.55 Outer space: cooperation with the Committee on the Peaceful Uses of Outer Space, its scientific and technical sub-committee, and its working group on remote sensing of the earth by satellites.

13.56 *Economic Commission for Africa*: meetings of the Executive Committee; third session of the ECA Technical Committee of Experts; cooperation in preparing health section of African regional plan of the World Plan of Action; fourth session of the ECA Conference of African Planners; second ECA regional interagency coordination meeting on population; second ECA subregional Conference on Popular Participation in Development; together with UNDP, assistance in organizing a training course for African building contractors in Algeria and Tunisia; ECA West African subregional meeting on port management; meeting of representatives of non-United Nations organizations interested in population work in Africa; fourth meeting of government officials responsible for development information and directors of information of organizations of the United Nations system.

13.57 *Economic Commission for Asia and the Far East*: twenty-eighth session of the Commission; meetings of the Commission's Transport and Communications Committee, and its Committee on Industry and Natural Resources; ECAFE regional seminar on population aspects of social development, and the Second Asian Population Conference; seminar on rural development, with special emphasis on the Lower Mekong Basin; working party on operational and technical aspects of Asian shipping development; conference on social development; ECAFE regional

interagency meeting on social development; ECAFE/IMCO working party and regional preparation for the United Nations/IMCO Conference on International Container Traffic; ECAFE Conference of Asian Statisticians; preparation of chapter on health for regional plan of action for the application of science and technology to development; expert group on socioeconomic returns of family planning programmes; tenth session of the regional conference on water resources development; organization of the third regional course in national health planning in cooperation with the Asian Institute for Economic Development and Planning.

13.58 *Economic Commission for Europe*: twenty-seventh session of the Commission; meeting of senior advisers to governments on science and technology; cooperation in studies of water and air pollution, and in a study of statistical services in selected countries of the region; working parties on national gains and balances (statistics on the distribution of income, consumption and wealth), and on a system of demographic and social statistics; plenary session of the Conference of European Statisticians; cooperation with regard to coordination of work on social indicators; ECE seminar on the methods used in long-term social planning and policy making; ECE Committee on Water Problems; preparatory meeting for seminar on pollution of waters by agriculture and forestry; ECE twelfth intersecretariat meeting on water pollution and related water questions in Europe; ECE *ad hoc* group of experts on the survey of water resources and needs; ECE seminar on water resources and needs; joint project with ECE on health, social and economic statistics as part of the overall health information system; statement on relevant WHO activities presented to ECE Committee on Housing, Building and Planning; ECE group of experts on road traffic safety; ECE group of experts on construction of vehicles.

13.59 *Economic Commission for Latin America*: preparation of chapter on health for regional plan of action in the application of science and technology to development; cooperation in development of regional nutrition plan as basis for national food and nutrition policies.

United Nations Economic and Social Office in Beirut

13.60 Second session of the preparatory committee for the regional population conference; joint sponsorship with UNESOB of expert group meeting on mortality trends in the Region.

Office of the United Nations High Commissioner for Refugees

13.61 Continued close cooperation with respect to health matters, particularly in reference to resettlement of refugees in Africa; twenty-third session of the Executive Committee of the High Commissioner's Programme; participation in interagency working group on United Nations assistance in the repatriation and resettlement in southern Sudan of Sudanese refugees and displaced persons, including the provision of advice on health matters and substantial assistance in purchasing supplies and equipment.

United Nations Industrial Development Organization

13.62 Designation of liaison officer to UNIDO; participation in first session of the Permanent Committee of the Industrial Development Board; consultations on programme activities, including wastes disposal and pharmaceutical production.

United Nations Institute for Training and Research

13.63 Continued cooperation with UNITAR on various studies (including a study on the emigration of professional

workers from developing to developed countries), and with regard to briefing or training sessions for fellows of the Institute, and various seminars; cooperation with UNITAR Commission on the Future; participation in a UNITAR seminar on staff training, a meeting on the proposed establishment of a United Nations staff college, and an international symposium on documentation of the United Nations and other intergovernmental organizations.

International Labour Organisation

13.64 Representation at sessions of the International Labour Conference and ILO Governing Body; close relations and frequent consultation on improved methods of cooperation in various areas, including occupational health, family health and manpower development; participation in and assistance to comprehensive employment strategy missions to Jamaica and Kenya; joint ILO/WHO conference to discuss the organization of courses in occupational health and safety based on modern concepts of the working environment; ILO *ad hoc* Committee on the Occupational Safety and Health Programme; ILO Asian symposium on labour and population policies; ILO international colloquium on occupational safety and health of young workers; ILO African seminar on workers' education and population questions; third session of ILO Inter-American Advisory Committee; cooperation in development of occupational health and industrial hygiene laboratory in Indonesia, with the assistance of UNDP; participation in a regional panel discussion on United Nations population programmes as related to Arab workers; completion of recommendations for a broad national programme on occupational health and safety in the Philippines; collaboration in selecting educational material for first aid for occupational and other accidental injuries, pursuant to resolution WHA25.63; ILO participation in WHO country-level seminars in the Western Pacific Region on the organization of occupational services in small industries; participation in ILO meeting of experts on control and prevention of occupational cancer; collaboration in project for the control of pollution of the working environment in Kuwait, and an ILO mission to Liberia with regard to the evaluation and planning of human resources development.

Food and Agriculture Organization of the United Nations

13.65 General: representation at FAO Council; joint seminar on African trypanosomiasis; FAO participation in Volta River project for onchocerciasis control; WHO participation in seminar on home economics development planning for English-speaking countries in Africa; informal consultation convened by FAO Freedom from Hunger Campaign.

13.66 Nutrition: regional seminar on dairy education and dairy development for English-speaking countries in Africa; twelfth regional conference for Latin America and related technical meetings; seventh regional conference for Africa; eleventh regional conference for Asia and the Far East; close cooperation in the work of the Protein Advisory Group of the United Nations System for which FAO currently serves as the administering agency.

13.67 Food safety: meeting of FAO/WHO Codex Alimentarius Commission; Joint FAO/WHO Expert Committee on Food Additives (special attention to problems of mercury, lead and cadmium); participation in other Codex Committees, including those on meat hygiene, processed meat products, food hygiene and fish and fishery products; meeting convened by WHO in conjunction with FAO and IAEA on legal aspects of irradiated foods; steps for more active participation in relation to control of food contaminants, pursuant to resolution WHA25.59; designation of four joint FAO/WHO collaborating laboratories

on food colours (see paragraph 6.64); joint sponsorship of FAO/WHO/UNICEF seminar on food control in Teheran.

13.68 Pesticides: joint meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues; participation in FAO seminar on the safe, effective and efficient utilization of pesticides in agriculture and public health in Central America and the Caribbean; FAO participation in WHO seminar on health hazards of pesticides in the Eastern Mediterranean Region.

13.69 Veterinary public health and zoonoses: consultation on programme of comparative virology and on animal mycoplasmas; collaboration on brucellosis control; participation in FAO/International Office of Epizootics panel of experts on tick-borne diseases of livestock.

United Nations Educational, Scientific and Cultural Organization

13.70 Representation at sessions of UNESCO Executive Board; consultation with respect to health education in schools; cooperation on health content of functional literacy programmes, and assistance to teaching programmes of UNESCO-sponsored Arab States Functional Literacy Centre; collaboration with regard to the International Hydrological Decade and the Man and the Biosphere programme, including participation in a panel of experts to consider the role of systems analysis and modelling projects in the latter programme; participation in a regional seminar on statistics of culture and mass communication for English-speaking and Arab countries in Africa, in a symposium on the role of social sciences in population activities, and in a preparatory meeting of experts for the Second European Conference of Ministers of Education; consultation on UNDP/UNESCO project on the feasibility of a regional satellite television system in education for the countries of Latin America; meeting of committee of experts on international comparability and equivalence of higher education and diplomas in the western Mediterranean countries; panel of experts on ecological effects of human activities on the value of lakes, marshes, rivers, deltas, estuaries and coastal zones as resources for food production and for amenity, recreation and wildlife conservation; meeting for the development of training programmes in communications for family planning; meeting of experts on research on communication in family planning; meeting on education in the more developed countries to prevent drug abuse; intersecretariat consultations with respect to areas of competence and responsibility of WHO and UNESCO regarding criteria for ascertaining the equivalence of medical degrees and diplomas; participation in UNESCO working group of experts on International Standard Classification of Education; collaboration in joint feasibility study, with UNDP support, on higher education in the Americas and in Morocco; interagency working group on preparations for the 1973 International Conference on Education of the UNESCO International Bureau of Education; establishment of informal interagency committee on new teaching methodologies; interregional consultation on communication and education in family planning; courses on molecular aspects of antigenicity and immunoglobulins jointly sponsored by UNESCO and WHO at the WHO Research and Training Centre for Advanced Studies in Immunology, Rehovot, Israel; regional meeting on education and population dynamics in Africa.

International Bank for Reconstruction and Development

13.71 Cooperative programme of water supply, wastes disposal and storm drainage; IBRD participation in Volta River onchocerciasis control project; IBRD support with regard to pre-

paration of family planning programmes for various governments (for example, Indonesia); close collaboration in the field of environmental sanitation in the Americas; participation in IBRD missions to Ghana (population questions) and the United Republic of Tanzania (pre-investment studies for water supply and sewerage).

World Meteorological Organization

13.72 Participation in twenty-fourth session of the Executive Committee, the fourth session of the Commission for Hydrology, and the panel on meteorological aspects of air pollution.

Inter-Governmental Maritime Consultative Organization

13.73 Collaboration (also with ILO) on a medical first aid guide for use in connexion with accidents involving dangerous goods; participation in United Nations/IMCO Conference on International Container Traffic; continued collaboration on problems relating to marine pollution, both directly and through the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP); preparatory meeting on space requirements for special trade passenger ships.

International Atomic Energy Agency

13.74 Co-sponsorship of panel of experts to prepare guidelines on environmental monitoring programmes and the assessment of the significance of environmental contamination; consultative meeting of the International Nuclear Information System liaison officers; international symposium on radiation preservation of food, with FAO; panel to examine the possibility of establishing international storage sites for high-level and alpha-bearing radioactive wastes; panel of experts to discuss the peaceful uses of nuclear explosions, their applications, characteristics and effects; symposium on the management of radioactive wastes; collaboration in international studies of trace elements in relation to cardiovascular disease (see paragraph 4.23); collaboration in the preparation of an IAEA publication on nuclear power and the environment and of a guide for the disposal of radioactive wastes, and in the revision of existing IAEA regulations for the safe transport of radioactive materials; joint development of a proposal for recording releases into the environment of radioactivity of global significance; co-sponsorship of a meeting for the preparation of a guide book for the safe use of radioactive tracers in industrial processes; consultations, with the collaboration of ILO, to review the use of radiation and radioisotopes for research in man; participation in an IAEA study group meeting on radiological and environmental protection; joint projects with regard to diagnostic and therapeutic radionuclides; extension of IAEA/WHO dosimetry services for cobalt teletherapy units; continuation of collaborative studies on iron deficiency; consultations on application of radiobiological techniques in immunization against malaria and African trypanosomiasis.

International Civil Aviation Organization

13.75 Continued consultation with regard to dichlorvos disinsection system for aircraft.

Other intergovernmental organizations

13.76 There was continued cooperation with the Organization for Coordination and Cooperation in the Control of Major Endemic Diseases (OCCGE); the Organization for Coordination in the Control of Endemic Diseases in Central Africa (OCEAC); the African, Malagasy and Mauritian Common Organization (OCAM); the South Pacific Commission; and the South-East Asia Medical and Health Organization (SEAMHO).

Organization of African Unity

13.77 Liaison officer with OAU maintained; cooperation with OAU Bureau for the Placement and Education of African Refugees; representation at the Preparatory Conference of the Council of Ministers, the ninth regular session of the Conference of Heads of State and Government, and the Executive Committee of the Inter-African Scientific Council for Trypanosomiasis Research and Control.

Council of Europe

13.78 Participation in a meeting on the reform of medical education; a committee of experts on the penal aspects of drug misuse; a study group on the coordinated medical research programme; a multidisciplinary symposium on drug dependence; a committee on social and health questions; the second working party on the abuse of medicaments; a working party on dental hygiene; a group of experts on questions arising from the implementation of administrative arrangements for the health control of sea, air and land traffic; a meeting of experts on the role of the university in the teaching of ecology and in the study of problems of the environment; close cooperation in the work of the European Public Health Committee; third memorandum on the activities of WHO in the European Region submitted to the Consultative Assembly of the Council.

Organization for Economic Cooperation and Development

13.79 Information meeting on the technical, health and psychological aspects of the disposal of radioactive wastes; meeting on national and international efforts to appraise present knowledge of the effects of environmental pollutants; meetings in connexion with the international food irradiation project; sessions of the Environment Committee; first meeting of group of experts to study the possibilities of promoting a programme of international cooperation in radiogenetics; meetings on population questions; OECD participation in WHO consultation on vision of drivers.

Council for Mutual Economic Assistance

13.80 Eighteenth conference of authorities concerned with management of water resources in member countries; continued cooperation in various areas of public health in the European Region.

League of Arab States

13.81 Pan Arab symposium on pollution, its effects and dangers, and means of protection against it in the Arab world.

Commission of the European Communities

13.82 Arrangements formalized by a new exchange of letters for mutual representation at meetings and exchange of information on health and environment questions in the European Region.

14. PUBLIC INFORMATION

14.1 "Your heart is your health" was the theme chosen for World Health Day 1972. The event received more support than in previous years, especially in South-East Asia where a large number of public meetings on this theme were held. Under the auspices of the International Society of Cardiology, the International Cardiology Federation and WHO, a World Heart Month was instituted in April as an international campaign supported in over 70 countries. Some societies, for example the Swiss Cardiology Foundation, extended the campaign to the whole of 1972. Postage stamps or other philatelic material to mark the event were issued by the postal administrations of the United Nations and of more than 40 countries or territories. The April issue of the UNESCO *Courier* was devoted to the World Health Day theme.

14.2 In addition to an information kit, WHO produced three films, a series of radio programmes, a special issue of *World Health* and, in collaboration with the American Heart Association, a poster in six languages for the occasion. World Health Day posters were also produced in Finland, India, Indonesia, Japan and the USSR.

14.3 Two of the films are colour cartoons, one produced in Moscow by Soiuzmultfilm Studios, the other in Geneva by Filmette S.A. The third film is based on interviews with the Director-General and leading cardiologists; it was produced largely with the technical facilities available at WHO. All three are intended to encourage a way of life that will help to prevent cardiovascular disease. Some 14 television networks broadcast one or more of the films, which reached an estimated audience of 50 million people. A thousand copies of the film produced in Moscow, entitled "Heart Sweet Heart", were distributed in the USSR alone by the national authorities. It was shown on a commercial cinema circuit in Switzerland and was awarded the Grand Prix at the Zagreb International Festival of Films on Protection at Work. The International Society of Cardiology gave valuable help in distributing all three films.

14.4 The World Health Day radio programmes were sent to some 140 networks in all parts of the world and were broadcast widely. In the New York area one station devoted ten hours to WHO and the World

Health Day theme and another carried a four-hour programme entitled "Music for World Health Day" with a health-linked commentary.

14.5 The world's press also contributed to the success of World Health Day. Messages from the Director-General and Regional Directors and articles supplied by WHO were used by newspapers and periodicals in many countries in all WHO Regions. In the Soviet Union, for example, several national newspapers and periodicals, each with a circulation of between 6 and 12 million, published extensive articles on cardiovascular diseases to mark the occasion. In the USA, a World Health Day message from President Nixon was widely reproduced. In the Federal Republic of Germany, a collection of articles in book form and a bibliography on cardiovascular diseases were published. Regional offices were able to have World Health Day material reproduced in numerous national or local languages. In collaboration with the American Heart Association and WHO, the Smithsonian Institution in Washington, D.C., mounted an exhibition on international health cooperation and heart disease which was on view from April to September.

14.6 More than 200 press releases, including feature articles, were distributed by WHO headquarters and the regional offices in 1972. Newspapers devoted numerous articles to smallpox eradication, and improvements in the cholera situation were mentioned with favourable comment on WHO's efforts. Other subjects relevant to WHO's work that were given prominence in the world's press included mercury poisoning and the danger of mercury accumulation in fish, the use of opium and its derivatives in medicine, cancer, and the proliferation of the medical vocabulary. Among the feature articles distributed, those on nutrition and on seaside holidays were widely reproduced.

14.7 In connexion with the Twenty-fifth World Health Assembly, the questions most frequently mentioned in the press were the representation of China and the application for membership of the German Democratic Republic. Among the technical subjects discussed by the Assembly, blindness and the impact of powerful new drugs were given greatest

prominence. The inauguration of the new buildings of the Regional Office for Europe in Copenhagen and of the International Agency for Research on Cancer in Lyons received considerable attention from press, radio and television in Denmark and France respectively and were reported in other countries also. Other important events of which notice was taken in the mass communication media included the III Special Meeting of Ministers of Health of the Americas which established ten-year health goals for that Region, and the various Regional Committee meetings.

14.8 Press-cuttings received in 1972 amounted to roughly twice the volume received in 1971. A considerable increase in press coverage of WHO activities was achieved, especially in the African Region. Comment on WHO continued to be largely favourable. Such criticism as was noted related to the Health Assembly's action regarding the German Democratic Republic and WHO's position on DDT. On the latter point, efforts were made with some success to counteract criticism. In the USA, for example, one programme in a television series entitled "The Advocates", carried by a national network, was conducted with a live audience taking part in a "prosecution and defence" debate on whether DDT should be banned entirely; the outcome was a wide approval of the continued use of DDT in the developing world until suitable substitutes can be found.

14.9 The circulation of *World Health*, the illustrated magazine of WHO, continued to increase and now regularly exceeds 220 000 copies, including all editions in different languages. During the year, the Russian edition was increased from 50 000 to 80 000 copies at no additional cost to WHO. These figures do not include extra printings done from time to time for special events such as World Health Day. Articles and photographs appearing in the magazine, especially those in the issues on cardiovascular diseases, on old age and on the medical assistant, were widely reproduced by other periodicals.

14.10 Under the auspices of UNESCO, 1972 was observed as International Book Year, which was made the theme of a double issue of *World Health*. Medical literature as an international bond, difficulties in learning to read, and aids for the blind were among the subjects treated.

14.11 The quarterly *Gazette*, published by the Regional Office for the Americas in English and Spanish, is now in its fourth year. It carried feature articles on drug quality control, cholera, cities and

their pollution problems, and the use of pesticides, among other subjects. The third issue of the year was devoted to the 70th anniversary of the Pan American Health Organization and included an article on the eradication of smallpox in the Americas. Notice of this anniversary was also taken in *World Health*.

14.12 The Regional Office for the Eastern Mediterranean brought out a French version of the book *Men and Medicine in the Middle East*, available through WHO sales agents. English and Arabic versions were published previously.

14.13 For the United Nations Conference on the Human Environment in Stockholm, a press feature and an issue of *World Health* were brought out, with articles on environmental health hazards. A photo exhibition and publications stand was set up at the conference in collaboration with the International Telecommunication Union. A similar stand was set up at the Sixth European Congress of Cardiology that met in Madrid in September. Exhibitions were increasingly used as a public information medium in the African Region.

14.14 Ten editions of the regular radio programme "Around the World with WHO" were broadcast by about 200 radio stations. A further 270 recordings were made. The total number of copies of recordings distributed during the year was approximately 2500. Thirteen languages were used.

14.15 The year's output of photographs from headquarters amounted to about 50 000 prints, widely used by publishers and for exhibition purposes. Photographic reportages were made in some 20 countries. A new catalogue of the WHO photo collection was published. Distribution of the series "Photos for Television" was continued and one new set was produced. Five new titles were added to the list of colour filmstrips with scripts in Spanish produced by the Regional Office for the Americas in collaboration with the National Medical Audiovisual Center of the Public Health Service in the USA. Over 7200 such filmstrips were distributed during the year.

14.16 A not inconsiderable part of WHO's work in public information consists in answering enquiries from individual journalists and members of the public. In the Regional Office for South-East Asia, for example, about 400 such enquiries were handled monthly. In response to enquiries addressed to the Regional Office for the Americas, some 1300 pieces of

printed material were dispatched each month. Receiving groups of visitors is a related public-relations function. At headquarters alone, visits were arranged for over 100 groups of health workers, students and others, making a total of about 5000 persons during the year.

14.17 In September, a public information project supported by UNFPA and relating to the health component of World Population Year, 1974, was launched. As a beginning, radio and photographic coverage of national family planning programmes in the Eastern Mediterranean Region was undertaken.

15. CONSTITUTIONAL, LEGAL, FINANCIAL AND ADMINISTRATIVE DEVELOPMENTS

Legal Matters

Constitutional and legal

15.1 Following their admission to membership in the United Nations in 1970 and 1971, Fiji, Qatar and the United Arab Emirates became Members of the World Health Organization in 1972 by depositing with the Secretary-General of the United Nations formal instruments of acceptance of the WHO Constitution. Bangladesh was admitted as a Member of WHO by the Twenty-fifth World Health Assembly and deposited an instrument of acceptance of the WHO Constitution with the Secretary-General on 19 May 1972, on which date its membership became effective. Also on 19 May 1972, the Twenty-fifth World Health Assembly admitted Papua New Guinea to associate membership, which became effective on 26 July 1972, when the Director-General received the notice of acceptance given by the Government of Australia as required under Rules 115 and 116 of the Rules of Procedure of the Health Assembly. At the end of 1972 WHO had 135 Members and two Associate Members. A list of Members and Associate Members at 31 December 1972 is given in Annex 1.

15.2 The Twenty-fifth World Health Assembly decided in resolution WHA25.1 to restore all its rights to the People's Republic of China and to recognize the representatives of its Government as the only legitimate representatives of China to the World Health Organization.

15.3 In accordance with resolution WHA24.20 the application for membership by the German Democratic Republic was submitted to the Twenty-fifth World Health Assembly, which decided in resolution WHA25.19 to defer consideration of this matter until the Twenty-sixth World Health Assembly.

15.4 In 1972 one Member State, the Union of Soviet Socialist Republics, deposited an instrument of acceptance of the amendment to Article 7 of the Constitution which had been adopted by the Eighteenth World Health Assembly in 1965 (resolution WHA18.48), thus bringing the total number of acceptances to 48.

15.5 During the year eight further Member States—Ethiopia, Iceland, Iran, Japan, Kenya, Luxembourg, Romania and Upper Volta—deposited with the

Secretary-General of the United Nations instruments of acceptance of the amendments to Articles 24 and 25 of the Constitution adopted by the Twentieth World Health Assembly in 1967 (resolution WHA20.36). By the end of 1972 the number of such acceptances had reached 69.

15.6 Cuba acceded with reservations to the Convention on the Privileges and Immunities of the Specialized Agencies together with its Annex VII which relates specifically to the World Health Organization.

15.7 In accordance with Rule 5 of the Rules of Procedure of the Governing Council of the International Agency for Research on Cancer, an Extraordinary Session of the Governing Council was convened to meet during the Health Assembly in order to set up a committee to discuss the financial rules and procedures by which the Agency is governed as well as the admission of new Participating States. At that session, the Governing Council decided to admit Japan as a Participating State in the International Agency for Research on Cancer.

15.8 The Twenty-fifth World Health Assembly accepted the amendments to paragraph 3 of Article VI of the Statute of the International Agency for Research on Cancer relating to the length of membership of members of the Scientific Council as adopted by the Governing Council during its ninth session in 1971.

Health legislation

15.9 The number of requests received by WHO for information on various aspects of health legislation continues to increase. Such requests received and dealt with in 1972 covered a very wide range of topics, including medical ethics, the control of drug abuse, radiosterilization of medical devices, health provisions in national constitutions, abortion, environmental health, the control of pesticides, the hygiene of camping sites, infant foods, cosmetics, medical laboratories, venereal disease control, the status of chiropractors and osteopaths, and measures to combat smoking.

15.10 There has also been a growing feeling in a number of developing countries that new and comprehensive health legislation is required, and WHO

assistance has been accorded to several Member States that have sought advice in this field. For instance, in the African Region, both the United Republic of Tanzania and Zambia received advice on health legislation from the Organization; and in the Eastern Mediterranean Region the Governments of Afghanistan, Ethiopia and Somalia were actively following up work initiated with WHO assistance in 1970 and 1971.

15.11 As part of its tasks of promoting a wider knowledge and understanding of health legislation, the Organization participated during the year in a number of meetings at which it attempted to clarify the legislative aspects of the subjects discussed. Among these were an international symposium on drug abuse, held in Jerusalem in May; a CIOMS round-table conference on the social and ethical implications of recent progress in biology and medicine, held in Paris in September; a UNESCO meeting on the equivalence of higher educational qualifications, held in Rabat, also in September; and a meeting in Tokyo in October of the International Advisory Committee on Population and Law. WHO also undertook the presentation of a course of lectures on health legislation in June at the International Course on Health Development organized in Antwerp by a number of Belgian and Netherlands institutions in collaboration. In March the Organization, jointly with FAO and IAEA, held a consultation on the legal aspects of food irradiation; the purpose of the meeting was to draw up guidelines for those countries wishing to introduce or modify their laws on this subject.

15.12 The greater part of the Organization's activities in this field remains, however, the selection for publication in the *International Digest of Health Legislation* of laws and regulations adopted the world over on topics of interest to national health administrations. Legislation from more than 50 countries or other jurisdictions was published, in full or in summary form, in the four issues of the *Digest* which appeared in 1972. Some of the texts of widest interest are indicated in the following paragraphs.

15.13 The continuing concern with environmental health and the protection of the environment has been manifested by the promulgation in many countries of new legislation or by the revision of existing legislation on various aspects of the subject. Thus, the Federal Constitution of Switzerland and the Basic Law of the Federal Republic of Germany have been amended to incorporate provisions on environmental

protection. New water pollution control legislation has been adopted in Iran, Israel, the Netherlands, Norway and Switzerland, and significant texts on noise control have been promulgated in Canada and the German Democratic Republic. The full texts of both of the latter items were published in the *Digest*, as were a recently enacted Netherlands law on air pollution and the "National primary and secondary ambient air quality standards" issued by the Environmental Protection Agency in the United States of America.

15.14 Food and drug legislation again occupied an important place in the *Digest*. The list of countries which have imposed restrictions on cyclamates now includes Costa Rica, Ireland, Norway and Thailand. Extended summaries were published of New Zealand regulations on milk treatment and on meat and meat products, and of United States legislation on eggs and egg products. United Kingdom regulations on the licensing of medicinal products, an amended version of the United States regulations on current good manufacturing practice for drugs, and two French orders dealing with drug trials were among the noteworthy items concerned with the control of pharmaceutical products.

15.15 The major items of legislation dealing with dependence-producing and psychotropic drugs included the Misuse of Drugs Act 1971 (United Kingdom), the Dangerous Drugs Act of 1972 (the Philippines), and an Argentine Law and Regulations on psychotropic drugs dated 11 October 1971. An important item of legislation on the treatment of drug-dependent persons came into force in the Russian Soviet Federated Socialist Republic (one of the Union republics of the USSR) on 1 September 1972.

15.16 The system of medical education in Algeria has undergone a major reform and the pertinent legislative texts were summarized. Numerous items of legislation dealing with the allied problem of the training of medical specialists (e.g., in Honduras, Iceland, New Zealand and Switzerland) have likewise been covered.

15.17 Other items of legislation of particular interest have included a Venezuelan law on transplantation approved on 19 July 1972, Romanian instructions (dated 24 July 1971) concerning the prevention and

control of venereal diseases, the Medical Termination of Pregnancy Rules, 1972 (India), and the Medical Termination of Pregnancy Regulations adopted in 1972

by several of the Indian States (those of Andhra Pradesh, Maharashtra, Mysore, Rajasthan, Tamil Nadu, and Uttar Pradesh have been forwarded to WHO).

The Financial Position

Budget for 1972

15.18 The effective working budget approved by the Twenty-fourth World Health Assembly for 1972 amounted to US \$82 023 000, which was an increase of US \$6 808 000 over the corresponding amount for 1971.

15.19 The revaluation of the Swiss franc in May 1971 gave rise to serious budgetary problems in 1972 caused by the need for a substantial increase in the amount of US dollars required to meet the expenditure incurred in Swiss francs. Through special measures of economy, including the postponing of a number of activities, it was found possible to meet these additional budgetary requirements without proposing an increase in the budget level for 1972.

15.20 Subsequent international monetary developments during the latter part of 1971, which resulted in adjustments to the parities of a number of currencies in relation to the US dollar, made it necessary to propose supplementary budget estimates for 1972 in order to meet the additional cost of implementing the approved programme for that year. Supplementary estimates were also proposed for 1972 in order to include in the regular budget those activities which were previously shown as being financed from the Special Account for Servicing Costs. This latter action was related to the decision of the Governing Council of the United Nations Development Programme to merge fully the Special Fund and the Technical Assistance components of UNDP as from 1972 and to consequential changes in the arrangements to govern overhead costs reimbursements. In the case of the former Special Fund component, such overhead cost reimbursements were previously credited to the Special Account for Servicing Costs.

15.21 In resolution WHA25.5, the Twenty-fifth World Health Assembly, on the recommendation of the Executive Board, approved supplementary budget estimates for 1972 amounting to US \$4 011 290 in respect of the effective working budget, thus resulting in a revised total effective working budget for 1972 of US \$86 034 290. In accordance with the Health

Assembly's decisions no additional assessments on Members were necessary in order to finance the supplementary estimates for 1972.

15.22 The approved budget level for 1972, including the supplementary estimates, was US \$99 700 524. The difference of US \$13 666 234 between the effective working budget and the approved budget level is accounted for by a transfer to the Tax Equalization Fund of US \$10 176 160 and the Undistributed Reserve of US \$3 490 074.

15.23 The distribution of the approved 1972 effective working budget among the appropriation sections, taking account of the adjustments referred to above, is shown in Annex 11.

United Nations Development Programme

15.24 Under the new UNDP system of country programming, projects are planned, approved and implemented within "indicative planning figures" (IPF) established for individual countries for a five-year period. In 1972 WHO received initial financial authorizations for the execution of UNDP-financed health projects during the IPF period 1972-76 to a total amount of US \$49 691 047; of this, US \$24 918 488 related to 1972.

United Nations Fund for Population Activities

15.25 During 1972 the Organization received a total of US \$7 355 996 from the United Nations Fund for Population Activities to carry out projects relating to health aspects of human reproduction, family planning and population dynamics (see Chapter 9) in accordance with the policy established by the Health Assembly.

United Nations Fund for Drug Abuse Control

15.26 A total amount of US \$72 240 was allocated to the Organization in 1972 by the United Nations Fund for Drug Abuse Control to carry out projects of assistance in the field of drug dependence (see Chapter 4).

Voluntary Fund for Health Promotion

15.27 Contributions in cash and in kind received in 1972 for the Voluntary Fund for Health Promotion amounted to US \$5 306 209, bringing the total of contributions credited to the Fund since its inception to US \$50 057 949, as at 31 December 1972. These contributions related to the following sub-accounts:

	1.1.1972- 31.12.1972 US \$	Total from inception US \$
Special Account for Medical Research:		
Unspecified activities	1 201	2 010 208
Expanded programme on human reproduction	1 455 435	4 656 917
Specified activities - other	1 455 339	9 307 540
Special Account for Community Water Supply	6 091	1 036 302
Malaria Eradication Special Account	157 009	21 288 295
Special Account for Smallpox Eradication	780 632	3 560 435
Special Account for the Leprosy Programme	80 000	609 083
Special Account for the Yaws Programme	18 268	71 086
Special Account for the Cholera Programme	45 633	1 969 083
Special Account for Assistance to Zaire	—	342 680
Special Account for Accelerated Assistance to Newly Independent and Emerging States	5 455	115 967
Special Account for Miscellaneous Designated Contributions	1 299 602	5 034 957
General Account for Undesignated Contributions	1 554	55 396

Working Capital Fund

15.28 The obligations incurred in 1972 and the status of the collection of contributions and of advances to the Working Capital Fund at the end of 1972 are shown in the Financial Report,¹ which is published as a supplement to the Annual Report of the Director-General for submission with the Report of the External Auditor to the Twenty-sixth World Health Assembly.

15.29 The Twenty-fifth World Health Assembly (in resolution WHA25.13) decided that Part I of the Working Capital Fund, composed of advances

assessed on Members, should remain at the amount of US \$5 000 000 to which should be added the assessments of Members joining the Organization after 30 April 1965. Part I amounted to US \$5 027 000 at 31 December 1972. In the same resolution, the Assembly decided that Part II, made up of transfers of casual income, should remain established at US \$6 000 000 for 1973. The amount of the Working Capital Fund thus totalled US \$11 027 000 at 31 December 1972.

Revolving Fund for Teaching and Laboratory Equipment for Medical Education and Training

15.30 The status of the Revolving Fund for Teaching and Laboratory Equipment for Medical Education and Training is shown in the Financial Report.¹ During 1972, 40 requests, amounting to US \$706 110, were accepted (see also paragraph 15.45).

Real Estate Fund

15.31 The status of the Real Estate Fund, which was established by the Twenty-third World Health Assembly, is shown in the Financial Report.¹ The Twenty-fifth World Health Assembly (in resolution WHA25.38) appropriated to the Real Estate Fund the sum of US \$1 460 435 from casual income, of which US \$580 600 for the financing of the authorized construction programme and US \$879 835 as recommended by the Executive Board, to build up credits for the ultimate construction of the permanent addition to the headquarters accommodation.

15.32 The Twenty-fifth World Health Assembly authorized for the 12-month period beginning in June 1972 a construction programme to be financed from the Real Estate Fund, at an estimated cost of US \$840 592,² of which US \$360 040 related to supplementary credits for projects authorized for the period 1 June 1970 to 31 May 1971, US \$219 752 to the supplementary credits for projects authorized for the period 1 June 1971 to 31 May 1972, and US \$260 800 for the construction programme for the period 1 June 1972 to 31 May 1973.

Administration

Structure

15.33 Organizational changes in 1972 were mainly directed towards relating the headquarters structure

(shown in Annex 14 as at 31 December 1972) to the Organization's principal programme objectives set out in the fifth general programme of work.³ The

¹ *Off. Rec. Wld Hlth Org.*, 1973, No. 208.

² *Off. Rec. Wld Hlth Org.*, 1972, No. 201, pp. 85-86.

³ See *Off. Rec. Wld Hlth Org.*, 1971, No. 193, Annex 11.

Division of Health Manpower Development was established to incorporate the former Division of Education and Training, the staff of the Division of Environmental Health concerned with the development of sanitary engineering manpower, and the staff from the units of Community Health Services and Nursing (both disestablished) also concerned with manpower development. The remaining staff of these two former units were transferred to a new Division of Strengthening of Health Services, which was created by merger of the former Division of Organization of Health Services and the former Division of Epidemiology and Communications Science. The units that had made up the latter division (namely, Research in Epidemiology, Behavioural Sciences, Ecology, Operational Research, Mathematics-Statistics, and Numerical Analysis) were disestablished and their staff assigned specific responsibilities in the new division. The unit of Health Education was transferred to the Division of Family Health and that of Health Legislation to the Legal Office, which was renamed the Legal Division and comprises the two units of Health Legislation and of Constitutional and Legal Matters. To the Division of Noncommunicable Diseases (formerly Division of Health Protection and Promotion) were transferred the unit of Human Genetics from the Division of Family Health and the unit of Drug Dependence, renamed Drug Dependence and Alcoholism, from the Division of Pharmacology and Toxicology. That division was renamed the Division of Prophylactic and Therapeutic Substances, and its units of Drug Efficacy and Safety and of Drug Monitoring were amalgamated into a unit named Drug Evaluation and Monitoring; the unit of Food Additives was transferred from this division to the Division of Environmental Health. As a result of disestablishment of the unit of Programme Evaluation and the transfer of its activities to the Headquarters Programme Committee, the former Division of Co-ordination and Evaluation was renamed the Division of Co-ordination. A unit of Building Planning and Construction was established in the Division of Administrative Management and Personnel to be responsible for the planning and construction of the addition to the headquarters building.

15.34 Organizational changes were also made in some of the regional offices. In the African Region the Education and Training unit was renamed the Health Manpower Development unit and the Organization of Health Services unit became the Strengthening of Health Services unit. A new unit entitled the Non-communicable Diseases unit was established. In the European Region units for Health Information and for Laboratory Services were established.

15.35 The structure of the Organization as a whole as at 31 December 1972 is shown in Annex 14.

Staff

15.36 On 30 November 1972, the total staff (excluding staff of the Pan American Health Organization) numbered 3758 as compared with 3643 on 30 November 1971, an increase of 3.15%. Details of the numbers and distribution of the staff and of its composition by nationality on 30 November 1972 are given in Annexes 12 and 13. The latter shows that on that date the number of Members whose nationals were employed by the Organization in posts subject to geographical distribution was 103, or about 75.2% of the total membership of the Organization.

15.37 In the Regional Office for the Americas work-sampling studies of secretarial and certain other staff were undertaken in order to examine existing ratios between secretarial and professional staff, and to establish basic indices of productivity for administrative and budgetary purposes.

Headquarters and regional office accommodation, and related matters

15.38 The Organization acquired the land necessary for the construction of a permanent addition to the headquarters building in December 1971, and in May 1972 the Twenty-fifth World Health Assembly, in resolution WHA25.37, approved a procedure for choosing an architect to prepare preliminary plans and estimates for submission to the Twenty-sixth World Health Assembly. The architect, Mr Arthur Bugna of Geneva, was chosen in June 1972 and immediately began studying requirements and preparing draft plans.

15.39 Meanwhile, construction of the temporary building and underground garage, which had been authorized by the Twenty-fourth World Health Assembly (resolution WHA24.22) continued, and the Organization took possession of them in September. Acquisition of the new premises made it possible to cease renting office and storage space elsewhere in Geneva.

15.40 In the African Region, the construction of 30 housing units for the staff of the Regional Office for Africa was completed and work was started on the extension of the Regional Office building.

15.41 In the Region of the Americas, in addition to WHO's contribution of US \$100 000 towards the cost of the new Zone Office building in Brasilia (in accordance with resolution WHA25.39 of the Twenty-fifth World Health Assembly), the Pan American Health Organization Executive Committee approved a borrowing authority of up to US \$200 000 for the same purpose.

15.42 The new headquarters building of the Regional Office for Europe was completed and inaugurated on 18 September 1972 at a ceremony prior to the opening of the twenty-second session of the Regional Committee for Europe.

15.43 The Twenty-fifth World Health Assembly in resolution WHA25.40 authorized the construction of a small addition to the accommodation of the Regional Office for the Eastern Mediterranean at an estimated cost of US \$33 000. The Regional Office obtained the concurrence of the host government to this structural alteration and its agreement to the extension of the lease of the office building for fifteen years beyond 1978, when the present lease expires.

15.44 The offices of the United Nations Information Centre and of UNICEF, hitherto accommodated in the Regional Office for the Western Pacific, left the building for new accommodation; the UNDP office also relinquished the storage and parking facilities provided to it. The release of this space helped to relieve the crowded conditions which had developed over the past few years.

Supply services

15.45 The total value of supplies and equipment purchased through headquarters during 1972 approached US \$11 500 000, not including approximately US \$1 500 000 required to cover freight and insurance charges. Line items ran to 41 000. Some 8000 purchase orders were placed with upwards of 2000 different suppliers in 31 countries for shipment to approximately 2000 projects, institutions and receivers of grants in 120 countries. These figures include purchases made on a reimbursable basis for 30 countries, and for the United Nations and specialized agencies, the United Nations Children's Fund, the Office of the United Nations High Commissioner for Refugees, the United Nations Relief Operation in Dacca, the United Nations Disaster Relief Office, the International Computing Centre, the International Agency for Research on Cancer, and intergovernmental and non-governmental organizations in official relations with

WHO, amounting to US \$3 835 000. Of this total, US \$441 500 were for purchases made out of the Revolving Fund for Teaching and Laboratory Equipment for Medical Education and Training. Purchases from research grants awarded to individual investigators or institutions amounted to US \$336 000.

Supplies for emergency and relief operations

15.46 The cholera pandemic did not spread to new countries during 1972, and with improved control of the disease in countries already affected there was a corresponding drop in the despatch of cholera supplies. Shipments from donated stocks of these supplies were made to combat outbreaks in ten countries in the African, South-East Asia and Eastern Mediterranean Regions.

15.47 The Organization continued to purchase supplies to replenish the Indian Government's stocks expended in taking care of refugees before their return to Bangladesh. The value of these supplies amounted to approximately US \$1 000 000. Medical supplies, also to a value of approximately US \$1 000 000, have been purchased with funds provided by the United Nations Relief Operation in Dacca and despatched to Bangladesh. These supplies included vaccines, other pharmaceuticals, and transport, as well as specific supplies required for the control of smallpox, tuberculosis and malaria. Arrangements were made for obtaining transportation for the despatch of these emergency supplies at low or no cost to the Organization.

15.48 In connexion with the disaster caused by torrential rains in the Philippines the Organization, in cooperation with the United Nations Disaster Relief Office, purchased supplies to a value of approximately US \$120 000, consisting of antibiotics, antidiarrhoeal tablets, cough mixtures, water-sterilizing tablets and large quantities of rehydration fluid. These supplies were procured at a cost far below the normal wholesale prices, and free air transport up to an amount of US \$150 000 for the despatch was obtained.

15.49 Within the framework of the long-term programme for the reconstruction of the Southern Region of Sudan—for which the Secretary-General of the United Nations has asked the Administrator of UNDP to serve as the central point—WHO has taken appropriate action for the procurement of supplies to a value of US \$1 000 000, made available from con-

tributions to the Office of the United Nations High Commissioner for Refugees. An initial list of requirements comprised X-ray equipment, pharmaceuticals, vaccines, antibiotics, equipment for establishing dispensaries and first-aid centres, and material for re-equipping existing hospital facilities in southern Sudan.

Co-ordination in administrative, budgetary and financial matters within the United Nations system of organizations

15.50 The standard provisions for the financial regulations relating to external audit, developed in collaboration with the Panel of External Auditors and approved by the Administrative Committee on Co-ordination, were endorsed by the Twenty-fifth World Health Assembly in resolution WHA25.14 for immediate application with some adaptations which were necessary to meet the Organization's constitutional provisions. Other financial regulations pertaining to custody and investment of funds and delegation of authority applicable throughout the United Nations system were approved by the Administrative Committee on Co-ordination.

15.51 The Organization participated in the inter-agency task force entrusted with the development of a cost-identification and cost-measurement system to be used for the determination of the reimbursement to executing agencies of overhead costs for the execution of UNDP-financed programmes, and of systems of cost measurement for the planning, budgeting, financing, implementation and evaluation of headquarters and field activities, as well as for cost control purposes.

15.52 In July 1972 the Special Committee for the Review of the United Nations Salary System—established by the United Nations General Assembly in 1970 to undertake a review of the long-term principles and criteria governing the whole United Nations common system of salaries, allowances and other benefits—issued its report for submission to the United Nations General Assembly. This report was examined in detail by WHO and the other organizations of the common system and comments were prepared for the consideration of the International Civil Service Advisory Board. This Board

met in September and formulated comments for the General Assembly on the report of the Special Committee as requested by the General Assembly.

15.53 At the request of the United Nations General Assembly, further interagency consultations were undertaken under the auspices of the United Nations Institute for Training and Research on the idea of establishing and the financing of a United Nations Staff College, whose objective would be to provide short courses in development programmes and modern management techniques to international civil servants.

15.54 Two formal reports received from the Joint Inspection Unit were considered by the Executive Board at its forty-ninth and fiftieth sessions, held in January and in May respectively, together with the Director-General's comments. The first report dealt with the activities of the Joint Inspection Unit for the period July 1970 to June 1971, and the second with country programming. The Director-General's comments and the decisions of the Executive Board on these reports were transmitted to the Economic and Social Council, to the Chairman of the Joint Inspection Unit and to the External Auditor.

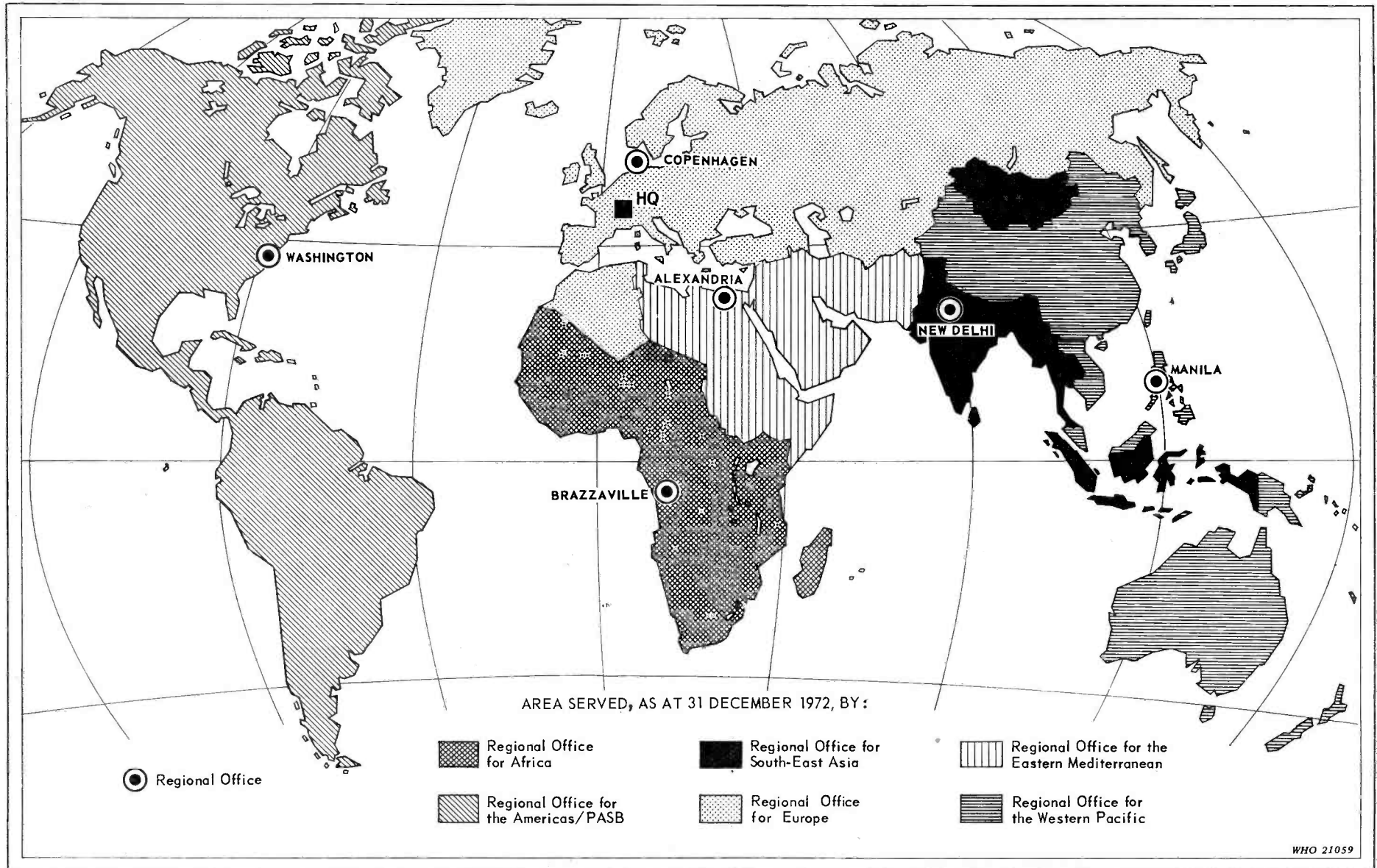
15.55 The consideration of the Joint Inspection Unit report on a rationalization of the proceedings and documentation of the World Health Assembly was completed, resulting in the introduction of a series of new measures designed in particular to further rationalize the documentation of the Health Assembly.

15.56 In compliance with the United Nations General Assembly's resolution 2735 A (XXV), the World Health Assembly considered the question of the continuation of the Joint Inspection Unit. The Health Assembly, while considering that, with amended terms of reference, the Unit should again be continued on an experimental basis, believed that changes were desirable in its internal arrangements. Greater emphasis should be placed on the advice that the Unit could provide with a view to achieving better rationalization, improved management and greater uniformity in the work of the United Nations system. The views of the Health Assembly, as embodied in resolution WHA25.34, were transmitted to the United Nations General Assembly.

PART II

THE REGIONS

Fig. 7. WHO Regional Offices and the areas they serve



16. AFRICAN REGION

16.1 During 1972, WHO's programme in the African Region laid emphasis on the development of epidemiological services and basic health services embracing a number of activities in environmental health, family health including maternal and child health, and the control of certain communicable diseases previously covered individually under separate projects. Health planning and the training of auxiliary personnel also form part of such integrated activities. Particular attention was given to health manpower planning and to education and training activities ranging from the provision of teachers of health sciences to the organization of teacher training courses in educational methods. As in past years, support was given to efforts to combat communicable diseases, whose range and gravity ensure their remaining of deep concern to health administrations.

Communicable diseases

16.2 The Organization assisted Member States in 15 projects for epidemiological surveillance and communicable disease control and also helped to co-ordinate national activities and programmes in these fields. Support was given by the WHO epidemiological surveillance centres in Abidjan and Nairobi, whose activities have been reorganized to allow for more direct assistance to national epidemiological services.

16.3 The attack phase in smallpox vaccination campaigns was completed in virtually all countries of the Region, achieving a coverage of between 80% and 90% of the populations concerned. Only in Botswana have difficulties been encountered in controlling the disease. In the immunization campaigns against yellow fever, 500 000 doses of vaccine have been distributed and epidemiological surveys are continuing; very few cases were reported (from Ghana and Zaire). Relatively little assistance was requested for the specific control of measles and poliomyelitis. Encouraging results were obtained in the control of trachoma and louse-borne typhus. Studies on venereal infections and treponematoses were carried out in Niger and in the Senegal River basin.

16.4 Activities in tuberculosis control have now, for the most part, been integrated with those of

epidemiological services or basic health services; emphasis continues to be placed on case-finding by direct microscopy and on domiciliary treatment. There are 25 BCG vaccination programmes in the Region, operated for the most part in connexion with smallpox vaccination campaigns. Leprosy control is in general carried out with assistance from other sources, and WHO's contribution is mainly advisory rather than operational.

16.5 With respect to cholera, which seems to have settled into a state of endemicity in several countries, the Organization has placed much stress on the improvement of environmental health and on health education, while continuing to supply drugs, rehydration fluid, vaccines and laboratory equipment. Plague, although it exists only in a restricted number of residual foci, calls for continuing vigilance.

16.6 Malaria is still the most widespread communicable disease in the Region, at least half of whose population is estimated to have malaria parasites in their blood. WHO's programme is carried out principally through three intercountry projects based on Cotonou, Dar es Salaam and Freetown and through basic health services development projects.

16.7 As regards onchocerciasis, the work of the preparatory assistance mission to the seven governments concerned in the control programme in the Volta River basin has laid the foundations for coordinated data collection and vector control research on a very large scale. Schistosomiasis is spreading as a result of engineering work to develop agriculture and water resources. In addition to undertaking research, based in Ghana, on the development of effective and economical methods of schistosomiasis control in man-made lakes, the Organization continued to assist countries with pilot control studies. Residual foci of trypanosomiasis still exist in a large number of countries; no practical applications have yet been made of the promising results obtained in the operational research project in Kenya.

16.8 Apart from training activities undertaken through the epidemiological services projects in Abidjan and Nairobi, WHO organized courses in cholera control at Accra and Bamako, and either organized or took part in seminars on a variety of subjects, including

vaccination schedules for children in Africa, cerebrospinal meningitis, African trypanosomiasis, malaria and the surveillance of communicable diseases.

Noncommunicable diseases

16.9 The interest in matters of dental health evinced by Member States at the twenty-first session of the Regional Committee, in 1971, gave rise to several requests for assistance in this field during the year under review, and surveys showed that in a number of countries the level of fluorides in drinking-water is either too high or too low.

16.10 There has also been growing interest on the part of countries in the Region in other hitherto relatively neglected fields such as mental health, cardiovascular diseases and cancer. While assistance in mental health was restricted in 1972 to help in teaching in two countries, an intercountry project is being initiated that will allow for a wider range of assistance in the future (see also paragraph 16.33). Information on cardiovascular disease and its control was collected in countries of the Region, and research on this subject is being carried out in Nigeria with WHO assistance and by an interregional research team based in Kampala. There is now an intercountry project providing assistance in cancer control; this operated in Zambia during the year.

Environmental health

16.11 Activities in environmental health during the year were carried on principally through 21 integrated projects for the development of basic health services. The development of community water supplies and sanitation in rural areas and in demonstration zones was in many cases related to cholera control activities. Research undertaken in Kenya on the elimination of coffee industry wastes was one example of the increased attention now being given to the control of industrial pollution.

16.12 In the field of pre-investment planning, WHO was the executing agency for 14 UNDP projects for water supply, drainage and sewerage in urban areas and for four in rural areas or of a countrywide character. WHO assisted in 15 economic development projects carried out by UNDP, FAO or ILO. Two intercountry projects provided consultative services in socioeconomic development and water supply and sewerage. Their principal activities were to evaluate existing conditions and to prepare preliminary studies for future projects. Advisory services were provided

to four countries in connexion with the establishment of national services in occupational health.

Strengthening of health services

16.13 The Organization assisted 42 projects for the development of basic health services in the African Region; this reflects the interest of governments in increasing health coverage in rural areas and in integrating health delivery services. Particular attention was paid to health planning and the coordination of planning activities in the health and socioeconomic fields. In addition to the usual integrated activities, certain of these projects included specialized work in malaria, sanitation, and the training of auxiliary personnel. In 1972, operational assistance was given within projects for developing health services in three countries; in a project in one of these (Zaire) the national staff have now been able to take over the work. There was evidence of a need in the Region for further assistance in the fields of hospital administration, rehabilitation and training of technicians for the repair and maintenance of medical material.

16.14 Many countries requested assistance in formulating, executing or evaluating their national health plans, which in 26 countries are integrated into the national economic development plans. Several countries asked for advice with regard to insurance systems and health legislation.

16.15 Seven epidemiological services projects and 11 basic health services projects included activities for the development of health laboratories. Help was given in integrating laboratory services in health administrations and training laboratory technicians.

16.16 In nursing, emphasis was placed on the coordination of the work of nursing schools with that of basic health services; in a few instances, nurse teaching staff now play some part in planning nursing services. Increasing importance was attached to the role of the midwife in the promotion of family health. In the training and retraining of nursing staff increasing importance is given to the nurse's role in diagnosis and treatment.

16.17 Increasing interest has been shown by Member States in health education, particularly as regards communicable diseases, nutrition, environmental health, and family health; but activities in this field suffer from lack of resources and shortage of specialized personnel. Studies were continued with a view to setting up two health education training centres, one for English-speaking and one for French-speaking countries.

Family health

16.18 Progress was made in introducing maternal and child health activities into national health services and in training national health personnel. Assistance in this field was given to 25 countries in the Region through basic health services projects and to two through specialized projects. The evaluation of the results achieved is difficult owing to lack of statistical and demographic data, and an effort was made to improve the collection of information and the maintenance of records. The subject of family planning is given a wide connotation; assistance in connexion with infertility problems is planned for some countries, and in others the accent is placed on the spacing of pregnancies to improve the health of mothers and reduce infant mortality.

16.19 Nutrition activities are generally assisted through basic health services projects and intercountry consultative services. Nutrition surveys were carried out in several countries, and programmes of nutrition education and training were set up. More and better information on nutrition is being disseminated and appreciable results have been obtained in nutrition training for health staff.

Development of health manpower

16.20 Health manpower planning and the planning of education and training activities were a prominent feature of the Organization's 1972 programme in the Region. Pilot studies that were undertaken in several countries on their needs in health personnel resulted in the formulation of some useful working hypotheses for the development of health manpower. The conclusions of the regional symposium organized in Brazzaville in May on the methodology of health team manpower planning will also be of value for the organization of future activities in this field.

16.21 The administration of medical schools and the cost of medical studies were investigated and growing interest was shown in the strengthening of public health teaching at both undergraduate and post-graduate levels. A project to assist in establishing or developing departments, institutes and schools of public health went into operation. Preparatory work continued towards establishing regional teacher training centres in Kampala and Yaoundé and the possibility was examined of including an audiovisual aid unit in the Kampala centre.

16.22 The Organization assisted in strengthening the training of professional staff through 15 projects operating in 13 countries; assistance was also given

to two projects which started in 1972 for the training of auxiliary staff.

16.23 Short-term and long-term plans for the fellowships programme were drawn up. A large proportion of the available funds is taken up for the undergraduate training of medical personnel from countries which have no health sciences faculty.

16.24 Efforts to develop resources in nursing personnel were continued. The number of candidates for postbasic nursing training increases from year to year, but the teaching facilities are insufficient and the output of trained personnel has been too small to make an appreciable impact on the development of nursing services. A second regional centre for post-basic nursing education in French began operation in Yaoundé during the year.

16.25 The teaching of sanitary engineering continued to be included in the programmes of engineering schools in Ghana, Kenya, Nigeria and other countries. The training of intermediate level health personnel is given in demonstration zones and urban training centres by WHO staff working in some 20 basic health services projects.

The Regional Committee

16.26 The twenty-second session of the Regional Committee for Africa was held at Conakry from 20 to 27 September 1972. The session was attended by representatives of 30 Member States. Representatives of UNDP, UNICEF, and the United Nations High Commissioner for Refugees were also present, as were those of the East African Community and five nongovernmental organizations. The Director-General was present during part of the session and was also represented by an Assistant Director-General.

16.27 During the discussion of the Annual Report of the Regional Director for the period 1 July 1971 to 30 June 1972, repeated mention was made of three subjects—the training of health personnel, the control of communicable diseases, and the organization of basic health services. Attention was drawn to the shortage of qualified personnel and to the evident need to accelerate the training of auxiliary personnel. The question was raised of the emigration of trained persons or their non-return from training abroad and it was clear that countries were becoming more and more convinced of the need to train their own health personnel. Two countries announced their intention to set up medical schools and a third in-

formed the Committee that it was already in a position to offer postgraduate medical training.

16.28 It was noted that a lull seemed to have occurred in the incidence of cholera in some of the countries affected in 1970-71 and that the disease had not appeared in new countries. Other diseases continued to cause concern, among them louse-borne typhus, which had still not been controlled in certain countries; onchocerciasis, a hitherto unsuspected focus of which had recently been found in one country; and malaria, whose incidence remained high. The Committee approved measures to strengthen the epidemiological surveillance system in the Region. Approval was given to the overall strategy for strengthening health services that had been developed in the Region.

16.29 Among the suggestions made during the discussions was one for the holding of a workshop that would help to improve understanding between health workers in the countries of the Region by trying to establish a common language in the field of basic health services.

16.30 The programme and budget proposals for the African Region in 1974 were approved for transmission

to the Director-General. The Committee noted that, despite an increase of 7.9% in regular budget funds, the proposed budget from all sources was decreased by 6% as compared with that for 1973. This was due to a marked reduction in the amounts allocated for activities financed by UNDP. It was for the governments themselves to give due priority to requests for UNDP assistance in the field of health.

16.31 The Committee approved the report of the Regional Director on long-term planning in environmental health.

16.32 The Committee confirmed its previous decision to hold its twenty-third session in Lagos, and decided that the twenty-fourth session would be held at the Regional Office in Brazzaville.

16.33 The subject of the Technical Discussions was "Environmental health activities in the context of an integrated concept of public health services". The Committee confirmed the previous choice of the subject for the Technical Discussions in 1973, "The place of mental health in the development of public health services in Africa". "Health care in rural areas" was selected as the subject for 1974.

17. REGION OF THE AMERICAS

17.1 The year 1972 marked the seventieth anniversary of the establishment, on 2 December 1902, of the International Sanitary Bureau, from which the Pan American Health Organization (PAHO) is derived. Statesmen from 11 American republics met in January 1902 in Mexico City at the Second International Conference of American States and proposed immediate joint action in the hope that it would eventually result in making sanitation take the place of quarantine. An international sanitary policy was formally adopted, periodic conventions on public health matters were planned, and a permanent executive body (the International Sanitary Bureau) was established at the end of the year in Washington, D.C., by the First International Sanitary Convention. The Bureau's objective was to "lend its best aid and experience toward the widest possible protection of the public health of each republic, in order that diseases may be eliminated and that commerce between the said republics may be facilitated".

17.2 Out of the International Sanitary Bureau grew the Pan American Sanitary Bureau, which in 1947 became the operating arm of the Pan American Sanitary Organization (the name of which was changed in 1958 to Pan American Health Organization—PAHO). In 1949 the Bureau also became the World Health Organization's Regional Office for the Americas, serving Member States in the Region of the Americas with a single programme embracing the activities of both PAHO and WHO. Over the years more States gradually joined the Organization, in which today all countries in the western hemisphere are represented.

17.3 At present the programme of the Organization in the Americas is oriented to the provision of assistance in two major health areas: the development of the health infrastructure (representing 40% of projects assisted in 1972) and the delivery of services (60% of projects). Among the former group of projects, 51% dealt with the organization and administration of health services in countries and 49% with manpower development; among the latter group, 55% were concerned with the delivery of services that affect the individual directly (e.g., communicable disease control, maternal and child health, nutrition) and 45% with environmental matters and supporting services.

17.4 This orientation of activities has been guided in large measure by the priorities of the First and Second United Nations Development Decades and of the ten-year health plan of the Charter of Punta del Este (1961). The Organization's policy in the Region will also incorporate the goals of the new ten-year plan covering the period 1971-80 set out at the III Special Meeting of Ministers of Health of the Americas in October 1972 (see paragraph 17.30).

17.5 For the control or eradication of communicable diseases emphasis was placed during 1972 on enforcement of epidemiological surveillance throughout the Region, coordination of field activities, and the training of epidemiologists.

17.6 The incidence of some *viral diseases*, such as Venezuelan equine encephalitis and dengue, rose during the year, and the situation with respect to rickettsial diseases, such as louse-borne typhus, remained essentially unchanged. The Organization's programme included developing a network of collaborating enterovirus laboratories, coordinating the distribution of arbovirus reagents from the international and regional centres, organizing surveillance activities for dengue in the Caribbean, and continuing the evaluation of attenuated typhus vaccines.

17.7 The Organization continued to promote the rationalization of *leprosy* control measures, with emphasis on the ambulatory treatment of patients to avoid their unnecessary institutionalization.

17.8 *Malaria*, which has been a health problem in 34 of the 47 political units of the Region, had by the end of 1972 been eradicated from 12 of these; transmission was practically interrupted in 4; and different degrees of progress had been obtained in the other 18 programmes. Research was continued in an effort to find solutions to the technical problems affecting these.

17.9 While, in the field of *mental health*, emphasis has continued to be placed on the organization of services, training of personnel, and epidemiological research, a certain number of new activities are also being developed, particularly in the areas of mental retardation and of alcoholism and drug dependence. Thus the Organization promoted the training of specialized

personnel concerned with alcoholism and drug dependence and expanded international epidemiological studies on alcoholism. Studies on the frequency and distribution of epilepsy are being initiated in Panama and Venezuela. The training of psychiatrists in Latin America was reviewed by a study group that met in Bogotá.

17.10 Activities in *cancer* control were oriented towards early detection and treatment, with emphasis on cancer of the uterine cervix and the breast; upgrading of specialized treatment facilities and personnel, mostly in the area of radiation therapy; education for the reduction of cigarette smoking; improvement and expansion of incidence registries; development of comprehensive care programmes with the participation of the community; encouragement of epidemiological research for better planning and evaluation and more effective primary prevention through the uncovering of causal agents; and enhancement of undergraduate and postgraduate education.

17.11 The construction, expansion, and improvement of water supply facilities continued to be predominant among *environmental health* activities in the Region, where there has been an investment of US\$2600 million in this field during the last ten years. Parallel to the water supply programme, extensive work has been done in the development of the essential infrastructure, the training and education of personnel at all levels, and the promotion of national research activities. The fact that the research programme in environmental health has grown from four projects in 1966 to 18 in 1972 is indicative of the importance that Member States attach to research for the solution of local problems. At the end of 1972, there were 97 air pollution sampling stations participating in the work of the Pan American Air Pollution Sampling Network, coordinated by the Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS), and as many stations promoted by the Centre but not within the network.

17.12 The conclusion of an agreement with Costa Rica for the development of a national radiation protection service within the Ministry of Health brought to 10 the number of countries in the Americas which the Organization is assisting in trying to control unwarranted *exposure to radiation*.

17.13 The Organization continued to assist governments in strengthening national health plans, with particular emphasis on the development of the required infrastructure; in programme preparation to ensure continuous and effective participation of the health

sector in national and regional development planning; and in formulating or adjusting their quadrennial projections of collaborative activities with the Organization in health matters. As in previous years, the Pan American Centre for Health Planning, Santiago, promoted and assisted in the establishment and strengthening of *health planning* processes in countries in the Region through training, research, and information services.

17.14 Some governments in the Region favour a single, integrated health service; by some others, a "*health system*" approach is preferred—one in which the work of different existing institutions in the health sector is coordinated in a common health plan. In 1972 six countries were in various stages of organizing a national health system or service, and in six others agreements were concluded between ministries of public health, social security institutions, universities, or any two of these, for the purpose of coordinating their hospital building plans or their personnel training programmes or for providing comprehensive health services to certain population groups.

17.15 The countries in the Region whose national *rehabilitation* programmes are the most developed have shown increasing interest in rehabilitation of disabilities other than those of the locomotor system, requesting assistance with projects concerned with speech, hearing, visual, or learning disabilities among children. However, several countries in the Region have yet to include in their public health programmes such basic services as physical and occupational therapy and the provision of simple prostheses and orthoses. In collaboration with the United Nations Bureau of Social Affairs, a study group met in Washington, D.C., in June to discuss the application of modern prosthetic and orthotic systems to disabilities of the locomotor system.

17.16 The *health laboratory services* programme was restructured during the year to the following main aims: establishment of specific programmes in 24 countries in order to develop national networks of laboratories to support the health services; strengthening and improvement of the production and quality control of biological substances used in connexion with communicable diseases (among these projects is that for the production of poliomyelitis vaccine in Mexico for use throughout the Region); organization of blood banks, including the establishment of a central laboratory for reference purposes and for the preparation of blood derivatives; and collaboration with other programmes in training laboratory personnel.

17.17 Most of the *health education* activities were focused on the organization of services, the improvement of the quality of health education programmes, and the training of personnel. Much emphasis was given to community participation in public health work; a good example is to be seen in Panama, which has 262 local health committees actively working to improve the level of health throughout the country. Education in the health aspects of family planning is being increasingly incorporated into national maternal and child health programmes. A draft guide for the review and appraisal of the educational component of family planning was prepared for field testing.

17.18 Assistance to *maternal and child health family planning* programmes was furnished to a number of countries. In some, particularly in Central America, in which maternity-centred family planning is followed, help was given for the development of a technological approach to the educational component of the programmes, and in the design and implementation of a standardized system for data collection and statistical reporting, this last being carried out in the data centre established in Costa Rica. In several countries of the Region the Organization increased its assistance for the improvement of perinatal care.

17.19 The Organization assisted in the operation of 35 *nutrition* projects, 21 of which were country projects and 14 regional or intercountry. Among the latter are included support for the Institute of Nutrition of Central America and Panama (INCAP), which renders specialized assistance to countries of the Region, and for the Caribbean Food and Nutrition Institute (CFNI).

17.20 The acute shortage of *nursing* personnel of all levels continues to be a serious problem in Latin America. There is a need to re-evaluate the system for the preparation of nursing personnel in order to be able to meet the requirements of health programmes. A project was started for the establishment of programmes for training at the Master's level in the different clinical areas of nursing. Among other activities were the elaboration of standards for nursing programmes at the university level; the organization of plans of studies at the superior (intermediate) level of education; and the training of teaching personnel and instruction in curriculum construction for the teaching of auxiliaries who will work in rural areas. Through advisory services, courses, and seminars the Organization collaborated with 312 schools of nursing (intermediate level of education) and in numerous programmes for the preparation of auxiliaries. Many countries in the Region, notably Bolivia, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Mexico, Paraguay,

Peru and Uruguay, were conducting analyses of their systems of nursing education.

17.21 Training in *health statistics* in the Americas was carried on at three levels—professional, intermediate, and auxiliary—instruction being provided in biostatistics, medical records, and computer science. However, the greatest lack is still of sufficient professional biostatisticians and medical records administrators. To meet the estimated needs for both professional and intermediate-level personnel, additional training centres will be required.

17.22 In matters of *education in the health sciences*, the Organization continued its assistance for developing and strengthening the institutions where these sciences are taught, and for promoting the teaching of the behavioural sciences in the curricula of medical schools. In addition to the continuing programme to provide textbooks at low cost for medical students, preliminary steps were taken in 1972 in respect of a new programme to make basic diagnostic instruments available to medical students entering clinical training. An agreement was signed with the Government of Brazil and the Federal University of Rio de Janeiro to establish a Latin American Centre for Educational Technology concerned with the preparation of audiovisual teaching aids for health sciences training programmes.

17.23 An analysis of the changes in the past decade in the Americas in relation to health brought out the need for new approaches to the education of health professionals, which should include not only such fields as biology and sanitation but also those of economics and the social sciences, for instance. Consideration is therefore being given to the creation of a Pan American Health University, which would offer advanced education for graduate health professionals within a coordinated system utilizing the best institutions in the Region in specific fields.

17.24 The PAHO Advisory Committee on Medical Research in June reviewed the *research* programme in the Region of the Americas. The 133 research projects currently receiving support are summarized in a recent report.¹ On the occasion of this Advisory Committee's session, two brief symposia were held: one on epidemiological studies and clinical trials in chronic diseases, which are growing in importance in Latin America; and the other on the support of biomedical research in developing countries in the Region by external aid agencies.

¹ PAHO/WHO (1972) *Research in progress, 1972*, Washington, D.C.

17.25 In the field of operational research, the Organization continued to contribute to the training of health administration personnel in the use of the critical-path method for the execution of health projects, and hospital industrial-engineering studies were conducted to demonstrate the advantage of systems analysis in the better utilization of existing hospital facilities.

17.26 The *Regional Library of Medicine*, São Paulo, Brazil, continued to expand its service and training programmes. There has been a notable increase in its interlibrary loan network within the countries of the Region. To achieve its goal of improving medical librarianship in Latin America, the Library has been offering six-week in-service training for staff members of newly established medical schools. It also sponsors advanced seminar courses in biomedical librarianship and in 1972 began courses for librarians at schools of dentistry, pharmacy, nursing and veterinary medicine.

The Regional Committee

17.27 The XXI Meeting of the Directing Council of the Pan American Health Organization, which was also the twenty-fourth session of the WHO Regional Committee for the Americas, was held in Santiago from 10 to 13 October 1972. It was attended by representatives of all 26 Member States in the Region and by those of France, the Netherlands, and the United Kingdom on behalf of certain territories in the Region. Observers from UNICEF, UNDP, ILO, FAO, the Organization of American States, and the Inter-American Development Bank, and 11 nongovernmental organizations attended. Also present were the Vice-Chairman of the PAHO Executive Committee and an Assistant Director-General of WHO.

17.28 Appropriations for PAHO for 1973 amounting to US \$22 348 146, 9.6% more than the 1972 figure, were approved. The Committee requested that the preparation of the proposed PAHO programme and budget estimates for 1974 be based on the provisional draft considered by it, after further consultations with the governments to determine their most recent requirements in relation to health priorities. The proposed WHO programme and budget estimates for the Region for 1974 were endorsed for transmission to the Director-General, with a request that he give favourable consideration to increasing the proportion assigned to the Region of the Americas.

17.29 Amendments to the Financial Regulations of PAHO were adopted similar to those adopted by the

Twenty-fifth World Health Assembly in respect of the Financial Regulations of WHO (see paragraph 15.50).

17.30 The Committee resolved to incorporate into the Organization's policy the recommendations contained in the ten-year (1971-80) health plan for the Americas¹ approved at the III Special Meeting of Ministers of Health of the Americas, that had been held in Santiago on 2-9 October, immediately preceding the Committee's session. The Committee requested the Regional Director to study the implications of the recommendations and the consequent modifications of objectives and priorities in the programme of the Organization, reporting thereon to the next session. It recommended that, in their planning, Member States should identify the priority health problems and establish objectives for each of them in accordance with their manpower, physical and financial resources. The Regional Director was requested to convene as soon as possible a working group of personnel responsible for planning and information and of health economists to design an evaluation system adaptable to the particular conditions of individual countries and yet capable of yielding comparable results, so that a Region-wide evaluation can be made of the decade's achievements. The Committee recommended that the Organization, in consultation with experts from Member States, should draw up general guidelines for determining the present financing of health investments and the changes required to carry out the plans and programmes envisaged in the ten-year health plan for the Americas. The Committee also suggested that national health authorities should initiate cost studies and, where possible, cost/benefit studies of their health services; and recommended that advisory services in all matters relating to the financing of the health sector should be furnished to countries requesting them, in order to assist Member States to ascertain more precisely what financial resources are earmarked for health and how they are related to the benefits obtained.

17.31 In view of the increasing demands for an effective health care delivery system and the importance of hospital maintenance and engineering services, the Committee urged ministries of health in the Region to establish maintenance units at the national level—if necessary, seeking financial assistance from UNDP—and to train qualified personnel and assign adequate funds for the purpose.

17.32 The Committee expressed gratitude to UNDP for the financial assistance given to the first phase of

¹ To be published by the Pan American Health Organization.

the programme of the Pan American Centre for Health Planning and endorsed a new orientation of the Centre's activities in a second phase, in which emphasis will be placed on information, the training of specialized manpower, and national research on health planning.

17.33 The Committee considered a report on a cost/benefit study on the prevention of *Aedes aegypti*-borne diseases in the Americas, prepared by a specialist firm in accordance with a resolution adopted at a previous session, and urged the governments of countries and territories where this vector was still present to pursue its eradication without delay. It expressed its thanks to the Governments of Trinidad and Tobago and of the United States of America for their generous voluntary contributions to the financing of the study; and requested the Regional Director to convene a group of experts in various disciplines connected with *Ae. aegypti* and the diseases it transmits to issue recommendations in the light of new knowledge and experience.

17.34 The Committee took note of the final report of the V Inter-American Meeting, at the Ministerial

Level, on Foot-and-Mouth Disease and Zoonoses Control. For the coordination of activities, it emphasized the advisability of representatives of ministries of health attending such meetings. It expressed its appreciation of the endeavours of the ministries of agriculture in the control of these diseases, urged that governments give serious consideration to the hazards to human and animal health of the indiscriminate use of pesticides, and reaffirmed its support of the Pan American Foot-and-Mouth Disease Centre and the Pan American Zoonoses Centre and their programmes.

17.35 The Committee considered that, to control the diseases which affect frontier zones, it is essential to carry out synchronized, coordinated measures financed simultaneously by the countries involved, and it requested the assistance of the Regional Office to this end.

17.36 The Technical Discussions, on community health services and community involvement, were postponed until the next session of the Regional Committee.

18. SOUTH-EAST ASIA REGION

18.1 Assistance provided by WHO to countries in the South-East Asia Region during 1972, in line with governments' health priorities, largely corresponded to the principal objectives outlined in WHO's fifth general programme of work—namely, the strengthening of health services, the development of health manpower, the prevention and control of disease, and the promotion of environmental health. Emphasis was also given to certain problems that are still of particular importance in many countries in the Region, such as malnutrition and the need for health education.

Strengthening of health services

18.2 Clearer recognition on the part of governments that health forms an integral part of socioeconomic development has led to greater emphasis on the establishment and expansion of planning units in the course of the reorganization and strengthening of national health administrations. Master plans of operation have been drawn up for the development of health services in a number of countries, and good progress has been made in the integration of specialized campaigns into the general health services. The third regional course on national health planning, organized by WHO in collaboration with the United Nations Asian Institute for Economic Development and Planning, was held in Bangkok from January to April.

18.3 Emphasis has been laid on the establishment of multidisciplinary teams at country and regional levels, and on the organization of multidisciplinary educational meetings to promote an exchange of ideas between different categories of health workers. WHO sponsored approximately 50 such meetings in the Region during 1972, including seminars and workshops on national health planning, maternal and child health, nursing, health education, health statistics, tuberculosis, plague, venereal diseases, rehydration therapy, immunology, immunization services, vesical calculus, dental health, psychiatry and community medicine.

18.4 Throughout the Region particular stress was laid on the protection of the mother and child against communicable diseases, on nutrition and on family health. To help combat the tremendous problems related to population growth affecting nearly all the countries of the Region, family planning projects are

included as part of most of these programmes; the projects are implemented on a broad basis with training as a prominent feature, bearing in mind the need for a strong and well-balanced health service infrastructure for this purpose. A large number of WHO-assisted family health projects have been developed with the support of UNFPA, the activities being coordinated with those of other agencies. A good example is the family planning programme that has been formulated for Indonesia with the support of IBRD.

18.5 Activities in the field of nutrition included continued assistance to applied nutrition and training programmes in India, Indonesia and Thailand; in Burma the role of nutritional rehabilitation centres as a means of preventing and treating protein-calorie malnutrition was emphasized.

18.6 The Organization assisted several countries in strengthening the health statistics divisions of health administrations, as a means of developing the statistical component of projects in the field of national health planning and population dynamics. It also provided statistical assistance for a number of health manpower studies and health planning programmes.

18.7 Help in the strengthening of health laboratory services—an increasingly important part of the general health services in the Region—has been concentrated on the development of competence and skill in laboratory technology through various training activities and the preparation of manuals. The Organization continued to pursue its policy of establishing and maintaining within the Region the required competence for the manufacture and assay of essential vaccines. Surveys were made of requirements and production facilities for rehydration fluid. The need to improve the quality control of pharmaceutical preparations and biological products is being increasingly recognized; an example of WHO's assistance in this field during the year was that provided to Thailand.

18.8 With respect to medical rehabilitation, assistance was continued for the training of physiotherapists in India, the development of medical rehabilitation services and a review of curricula in medical schools in Sri Lanka, and the establishment of physiotherapy units in provincial hospitals in Thailand.

Health manpower development

18.9 In the field of medical education, attention has been given to the improvement of teaching methods, the utilization of audiovisual aids, the development of task-oriented curricula, and the objective evaluation of student performance. Assistance was concentrated on educational planning and teaching methodology rather than on strengthening the teaching in particular disciplines. The development of two regional centres for the training of medical teachers, one in Sri Lanka and the other in Thailand, is in hand.

18.10 Comprehensive health manpower studies are under way in Indonesia and Sri Lanka. In addition, proposals were prepared for two large-scale projects, one in Burma and the other in Mongolia, for UNDP assistance in developing medical manpower and in equipping teaching institutions and field units at which health personnel are trained.

18.11 Assistance with regard to the training and utilization of auxiliary health workers was continued in most countries of the Region, and in two of them health workers previously engaged in specialized work were trained for multipurpose activities.

18.12 Group educational activities in the field of community medicine included the organization of seminars for medical administrators and other health personnel in Burma and Indonesia.

18.13 Increased emphasis was laid on training in human reproduction, family planning and population dynamics. With the support of UNFPA, a regional course on the teaching of these subjects was held in New Delhi for senior teachers of preventive and social medicine, obstetrics, gynaecology and paediatrics.

18.14 Efforts were made to promote the training of all categories of nursing and midwifery personnel. A large-scale training programme financed by UNFPA was developed in Sri Lanka, and assistance was continued to this country, as well as to Mongolia and Nepal, for the basic education of nurses and midwives. In Nepal, the schools for nurses and for other health workers were absorbed into the university system, forming the basis for a future centre for health sciences. In India, the teaching facilities at the college of nursing in Delhi were improved, and another college was established in Uttar Pradesh. India, Indonesia and Thailand continued to receive assistance for the preparation of nurse teachers, administrators, public health nurses and clinical specialists, and short courses on the improvement of patient care in hospitals

were held in Burma, Mongolia, Nepal and Sri Lanka. Problems related to the utilization of nursing personnel and the exodus of qualified nurses from the Region caused considerable concern in several countries.

18.15 Three-day refresher courses for senior medical students, nurse tutors and health personnel were held on various topics, including the control of hospital infections, modern methods of clinical diagnosis, methods of family planning, the care of the mentally disturbed, and new approaches to medical education.

18.16 In health education, a significant development during the year was the establishment of rural field practice areas in India, Indonesia and Thailand to provide practical experience as part of the post-graduate health education courses. During an inter-country workshop organized to discuss the experience gained in field training, it was suggested that multi-disciplinary study groups be established in various countries to examine current field training programmes.

Disease prevention and control

18.17 Progress in malaria eradication programmes has, in general, been steady. There was a considerable increase in the population actually covered by attack operations in Burma and India, as well as in that covered by the consolidation phase operations in Nepal and Thailand. With the assignment of Bangladesh to the Region there was an increase of some 15 million in the population living in the attack phase, and 47 million in the consolidation phase. There was little change in the situation in Sri Lanka, where the number of cases reported monthly remained between 10 000 and 14 000; a comprehensive review of the programme was made during March and April. The scope of the programme in Indonesia was considerably expanded, and now covers parts of the islands of Sumatra, Kalimantan and Sulawesi.

18.18 Improvements in notification and surveillance were considered to be the reason for the increase in the number of reported cases of cholera, which continued to be a problem in the Region, and for the rise in the number of cases of smallpox recorded in some countries. The main achievement regarding smallpox eradication was the interruption of transmission of the disease in Indonesia; progress elsewhere was also gratifying, although endemic smallpox became re-established in Bangladesh.

18.19 Emphasis continued to be laid on the development of tuberculosis control activities as part of the general health services. WHO-assisted programmes progressed according to plan in all countries, and

assessments were carried out in the Maldives and in Mongolia. Cases of human plague were reported only from an endemic focus in Burma. WHO provided assistance to that country with regard to surveillance activities and training, and a WHO-supported research project was started in the Region to study the ecology of plague and the factors contributing to the persistence of the disease in tropical countries. Leprosy continued to receive high priority, and the integration of specialized leprosy campaigns into the general health services was speeded up.

18.20 The epidemiological surveillance programmes in the countries of the Region cover all diseases subject to the International Health Regulations and, in addition, surveillance of other diseases has been satisfactorily established in several countries.

18.21 There has been increased interest in the control of cardiovascular diseases and cancer. Two projects in India may be mentioned as examples: the organization of coronary care units in urban hospitals, and the cancer control pilot project being carried out in Tamil Nadu with the aim of developing facilities for the early detection and treatment of cancer within the existing health care delivery system.

18.22 WHO's assistance in the field of drug dependence and abuse was illustrated by its cooperation with the United Nations in the development of a comprehensive programme to control drug dependence in Thailand.

Environmental health

18.23 With regard to environmental health, the emphasis remained on community water supply, but attention was also given to wastes disposal, environmental pollution, and training of personnel. Data on community water supply and sanitation in the countries of the Region have been collected to establish a basis on which to formulate plans enabling governments to work towards the attainment of the national targets set for the Second United Nations Development Decade.

18.24 A comprehensive plan has been established for the development of water supply, drainage and sewerage for the south-west coastal area of Sri Lanka up to the year 2000, the terminal report on this UNDP/WHO-assisted project having been submitted to UNDP during 1972. In Indonesia a survey was started to assess requirements for sanitation personnel and available training facilities, and a feasibility study was carried out regarding the improvement of urban water supplies in Irian Barat. Assistance was provided

to a number of countries for the development of community water supply, sewerage and drainage, including the Maldives, Mongolia and Thailand.

18.25 Regarding environmental pollution, assistance was given in the collection of data to be used as a basis for the formulation of programmes, and a regional seminar on air pollution control was held at Nagpur, India, in December.

18.26 With regard to occupational health, preparations were made for the development of an occupational health and industrial hygiene laboratory in Indonesia, with the assistance of UNDP and WHO and the collaboration of ILO, and help was given to Thailand in connexion with staff training programmes and a review of the country's occupational and industrial health services.

The Regional Committee

18.27 The twenty-fifth session of the Regional Committee for South-East Asia was held in Colombo from 12 to 18 September 1972. It was attended by representatives of all nine Member States in the Region, including Bangladesh, which joined the South-East Asia Region during the year. Representatives of the United Nations, UNDP, UNICEF, ILO and eight intergovernmental and international nongovernmental organizations, as well as an observer from the Colombo Plan, were present. The Director-General and an Assistant Director-General attended.

18.28 The Committee nominated Dr V. T. H. Gunaratne for reappointment to the post of Regional Director. In its discussion of the Regional Director's Annual Report for the period 1 July 1971 to 30 June 1972, the Committee emphasized the need to help strengthen health administrations at all levels, and to introduce modern administrative methods. Stress was laid on the lack of trained manpower. It was felt that the exodus of urgently required health personnel from some countries of the Region was largely due to inadequate manpower planning and the lack of training systems adapted to countries' needs. WHO-assisted studies in this field could play a valuable role.

18.29 With regard to family health, it was noted that the integration of separate family planning programmes into the health services was being planned or implemented in most countries of the Region. WHO's priorities could only match those of the governments, and improved coordination of all assistance was essential for the furtherance of these programmes.

WHO-sponsored research to find newer and cheaper methods of fertility regulation was noted with interest.

18.30 The Committee felt that the country programming approach, when applied to the coordination of United Nations assistance, could lead to lower priorities being accorded to health. It stressed the need for health ministries to give serious consideration to this problem, and underlined the importance of improving coordination at the national and international levels. National authorities and international and bilateral aid agencies should continue to give priority to programmes for the reduction of high mortality and morbidity rates resulting from malnutrition, poor environmental conditions and infectious diseases among children.

18.31 On the subject of environmental health, the Committee considered that the main problem in the Region remained the provision of safe water, especially in rural areas. In the fast-developing urban areas wastes disposal was also a major concern.

18.32 The Committee welcomed the targets set for the Second United Nations Development Decade, but stressed that lack of resources continued to be a constraint in most countries of the Region. The substantial assistance already being provided by the United Nations and bilateral aid agencies was inadequate to meet the needs, and it was felt that the targets were unlikely to be attained without additional aid.

18.33 In the discussion on the widespread hazards caused by the indiscriminate use of pesticides in agriculture, emphasis was laid on the valuable role that WHO could play, after assessment of the problem, in initiating adequate measures and providing assistance with regard to supplies and the training of personnel.

18.34 Concern was expressed regarding the impending withdrawal of other agencies' support to antimalaria programmes, and stress was laid on the need to persuade countries manufacturing DDT to maintain the level of production to meet global requirements. Countries in the South-East Asia Region alone account for just over half of all the DDT used for malaria programmes.

18.35 With regard to other communicable diseases, the Committee noted with satisfaction the role played by WHO assessment teams in helping governments

to draw up further plans for tuberculosis control. Continued assistance from WHO was thought necessary to maintain the present satisfactory progress in the smallpox programme. Although the cholera vaccine available was useful in controlling outbreaks, it was stressed that further research was required to develop a better vaccine. In the meantime, more countries were becoming self-sufficient in the production of rehydration fluid, and were thus in a better position to deal with cholera and other gastroenteric diseases.

18.36 The Committee noted with satisfaction the studies carried out in some countries in the Region to assess the extent and nature of the problem of drug dependence.

18.37 The proposed regional programme and budget estimates for 1974 were approved for transmission to the Director-General.

18.38 Regarding administrative matters, the Committee expressed its satisfaction with the progress made in recruitment. To a suggestion that expertise available within the Region should be made use of in the expeditious filling of posts, it was explained that the principle of equitable geographical distribution was a constitutional requirement and that it applied on a global and not on a regional basis.

18.39 Other matters discussed by the Committee included the development of a health charter for Asia and medical literature services to Member States. Concerning the last-named, the hope was expressed that WHO would be able to assist with regard to the translation of textbooks into various languages, and the provision of low-cost editions of these books.

18.40 The Committee confirmed its previous decision to hold its twenty-sixth session at the Regional Office, and accepted an invitation from the Government of Indonesia to hold its twenty-seventh session in that country in 1974.

18.41 "The teaching of community medicine in undergraduate medical education" was the subject of the Technical Discussions, which centred on the urgent need for adjusting teaching programmes to the needs and demands of the mainly rural communities in the Region. "Application of modern management methods and techniques for the improved delivery of health services" was chosen as the subject for the Technical Discussions to be held in 1973.

19. EUROPEAN REGION

19.1 Partly as the result of allocations of funds from new sources, the work of the Organization in the European Region increased both in volume and in scope during 1972. It would have been difficult to meet the growing demand on WHO's services, had this not coincided with the completion of the new Regional Office premises, donated by the Danish Government and inaugurated at the opening of the twenty-second session of the Regional Committee for Europe on 18 September, in the presence of HM the Queen of Denmark and HRH Prince Henrik.

19.2 In recent years the Organization has increasingly adopted a long-term approach in planning, in order to avoid fragmentation of effort and ensure the most efficient use of funds. The need for a closer coordination of the different activities in the Region was made clear by a review of past activities and a study of the long-term programmes in cardiovascular diseases, mental health and environmental pollution control that are in operation in the Region. A new long-term programme, in education and training, is being developed.

Long-term programmes in operation

19.3 Several European governments have generously given voluntary contributions to the programmes in environmental pollution control and mental health, showing that the need for concerted action in these fields is now widely recognized.

19.4 The year 1972 witnessed a considerable expansion of work on the control of *environmental pollution*. The international nature of the problem is increasingly evident and the demand for international and inter-governmental action and assistance is growing accordingly.

19.5 The long-term programme in this field has had to be restructured to some extent to meet changing needs. It is now divided into three parts, the first dealing with planning, information systems and terminology and the second with the development of services, manpower planning and training, while the third consists of sector programmes in ecology, water pollution, air pollution, solid wastes, noise, radiation and food control.

19.6 Manuals and codes of practice are at present being prepared on the following subjects: methods of analysis in water pollution, beach sanitation, air quality management (with guidelines for the setting of air quality standards), and land disposal of solid wastes. Information is being assembled from the literature on the effects on man and the environment of heavy metals and metalloids and on the long-term effects of air pollution on health, a subject on which pilot studies are being undertaken in two countries of the Region. Some of the studies in the long-term programme are joint ventures, carried out in close collaboration with WHO headquarters and supported by other international organizations such as the United Nations (through ECE) and WMO.

19.7 The manuals, codes and methods developed in the intercountry programme are tested and applied in country projects, and the experience gained in solving specific problems during country projects can be applied afterwards in other parts of the Region. Thus, automatic water quality monitoring was originally the subject of a country project in Poland, and environmental pollution information systems are being studied in a pilot area in the same country; the manual on water analysis and the model code for the land disposal of solid wastes, which were developed on a regional basis, will be applied in various country projects.

19.8 While environmental protection implies control of pollution emanating from industrialization and urbanization in many parts of the Region, it entails the promotion of basic sanitation facilities in the developing areas. WHO therefore continues to assist a number of countries in developing environmental health services and programmes.

19.9 The Organization was the executing agency for UNDP programmes for the development of water supply facilities in Algeria, Malta, Morocco, Turkey and Yugoslavia in 1972. The work in two of these countries has led to construction and investment programmes, of which one, in Morocco, is now being supported by a US \$48 million loan and the other, in Turkey, by a US \$36 million loan, both from IBRD. New UNDP projects or pre-project activities for environmental pollution control, with WHO as execut-

ing agency, were approved for Greece, Hungary and Poland.

19.10 Assistance for the training of sanitary engineers and for the study of new disciplines and development of new programmes in environmental health has continued at both the regional and national levels. A study has been started to assess the Region's requirements in environmental health personnel on a national basis.

19.11 The support given by all governments to the regional long-term programme in *mental health* has been most encouraging. The initial phase of the organization and planning component of the programme is of fundamental importance since it involves the collection of information on the existing facilities, manpower resources and organization of the mental health services in the Region. Twenty-nine Member States of the Region have completed a questionnaire on the subject, and the final tabulation and analysis of the data were completed in 1972. To fill gaps in the information, pilot studies were undertaken of resources for the care of psychiatric outpatients, psychogeriatric patients and the mentally retarded. As a fairly full picture of inpatient resources in the Region has been obtained, the Organization is now in a better position to advise and assist Member States and to develop other projects in the programme. Equally important, the inquiry has made certain Member States aware of the need for better mental health statistics.

19.12 Several meetings took place in the context of the programme in 1972, including a joint meeting of steering committees on alcoholism and drug dependence and on child and adolescent psychiatry. It was decided, however, that in future these subjects would be discussed separately to avoid any implication that drug dependence in adolescence is the principal concern of the programme on children and adolescents. Conferences were held on comprehensive psychiatric services and the community and on the epidemiology of drug dependence in the Region, and there were working groups on data collection and classification in services for the mentally retarded, on the content and presentation of health education programmes (with special reference to the prevention of drug abuse by young people), and on the nature, preventive treatment and control of deviant social behaviour and delinquency in adolescents and young adults. Studies were carried out on terminology and criteria in drug dependence and on treatment and rehabilitation for drug dependence and abuse.

19.13 An event of particular interest was the multi-disciplinary symposium on drug dependence, convened by the Council of Europe in Strasbourg, France, in March, in which the Organization played an active part.

19.14 The programme in cardiovascular diseases (see Chapter 4), which started in 1968 as the first of the long-term regional programmes, aims at developing and testing methods which will enable public health authorities to introduce control programmes at the community level. In its first phase (1968-72) this programme concentrated mainly on ischaemic heart disease. In the second phase (1973-77), stroke, hypertension, rheumatic fever, congenital heart malformations and chronic diseases leading to cor pulmonale will also be covered. There are individual projects dealing with prevention, detection, care, rehabilitation, the long-term follow-up of patients and certain aspects of education and training. WHO's activities have been coordinated with those of the International Society of Cardiology and its various councils and the European Society of Cardiology.

19.15 Aspects of the programme of special interest include the North Karelia project in Finland, in which preventive measures are being applied in a population of about 200 000, and the project on ischaemic heart registers involving 20 registration areas, two of them outside the Region. Ten centres are collaborating in the rehabilitation project for patients with acute myocardial infarction; preliminary findings point to significant differences between patients treated in the "traditional" way and those whose treatment has included comprehensive rehabilitation. Stroke registers and pilot programmes for hypertension control have been established.

Education and training

19.16 Practically all countries of the Region, even those with highly developed health services, are reconsidering the type of training needed by the members of the health professions, and the Organization is cooperating in the development of the requisite education and training programmes.

19.17 A long-term programme in education and training covering the period 1975-79 was approved by the Regional Committee at its twenty-second session, in September. Like the three long-term programmes already in operation, it is intended to stimulate countries to develop their own activities. The programme will be primarily concerned with communication and coordination between and within the health and education system, teacher training, con-

tinuing education, and specialization within the health professions. It will also deal with strategies for educational changes and innovations and with basic education.

19.18 An evaluation of the fellowships programme in the Region, which now deals with about 2000 fellowships every year, was carried out in 1972. The aim was to examine the experience gained since 1964, when the programme was last reviewed, and to see how the programme might be further improved. At a seminar on the organization of the fellowships programme, held in November, national fellowships officers discussed the planning and placement of WHO fellows in the European Region, as well as the exchange of information between the different Member States involved.

Strengthening of health services

19.19 In accordance with present-day trends in public health, the three long-term programmes already in operation in the Region aim at providing comprehensive services covering every aspect of health promotion, protection and care at the community level. This approach is being adopted in several Member States, and in 1972 the Organization was asked to help reorganize medical and health services in the autonomous region of Friuli-Venezia Giulia in Italy, and the Serbian Socialist Republic of the Yugoslav Federation. Data on the utilization of existing services in the two regions have been collected to provide a basis for recommendations in this connexion.

19.20 During 1972, the Organization published the first issue of a journal entitled *Public Health in Europe* intended for persons responsible for health planning or the teaching of public health. Health planning and the organization of medical care were the subject of several meetings or courses in the Region, including working groups on problems of health planning in national development and on the evaluation of public health programmes, the fourth advanced course on health planning, a symposium on the efficiency of medical care and a training course in operational research methods in public health.

19.21 To meet the growing demand in the Region for information on health matters, WHO is helping governments to develop their health information systems, promoting medical computing (mainly in its public health applications) and collecting and disseminating information. A study has been undertaken of the kind of information needed and the uses to which it will be put. At a European regional

conference on medical computing in July in Luxembourg, the participants agreed on the need for more international programmes in this field and singled out projects to which priority should be given.

19.22 Special importance is attached in the Region to the role of information in ensuring that the best possible use will be made of nursing and midwifery resources. The studies on advanced nursing education and on nursing resources and staffing patterns were continued, and a report is being prepared. In September-October, a course for psychiatric nursing tutors on new approaches to psychiatric nursing care was given in French in Paris, and a symposium on higher education in nursing was held in October-November in The Hague, Netherlands.

Family health

19.23 With the aid of funds made available by UNFPA and the Government of the United States of America, activities in the field of family health are being intensified. The United States funds are to be used exclusively for the benefit of Morocco, while the assistance from UNFPA will make it possible to set up a new country project in Algeria and implement an intercountry programme for the promotion of family health in the Region, notably through the provision of advice on obstetrics and gynaecology. With UNFPA support, a regional conference on the role of maternal and child health services in family planning was held in Ljubljana, Yugoslavia, in December.

19.24 While the curative aspect of family health is still very important in the developing areas of the Region, the emphasis in the highly industrialized areas must be placed on broadly based preventive measures in the fields of child psychology and social behaviour. In addition, since priorities differ from one area of the Region to another, more attention must be paid to the early detection and identification of particularly vulnerable groups of mothers and children. A critical evaluation of maternal and child health services in some countries of the Region has shown the need for certain structural changes.

Noncommunicable diseases

19.25 Two studies on organizational problems in dental health were carried out. The first was concerned with the organization and effectiveness of dental health services for children in Europe, and the second with the different uses of fluorides in caries prevention. In connexion with the latter, a cost/benefit analysis was carried out on the basis of data from five European countries.

19.26 A working group met in Oslo in November to discuss comprehensive cancer control programmes and evaluate experience in this field in various European countries over the past decade.

Communicable diseases

19.27 The emphasis in public health in the European Region has largely shifted away from a disease-oriented approach, but outbreaks of smallpox and cholera in 1972 demonstrated that its populations are still vulnerable to the communicable diseases and that close surveillance is essential. An outbreak of smallpox in Yugoslavia, causing 175 cases and 34 deaths, was successfully suppressed and resulted in only one imported case elsewhere (in the Federal Republic of Germany). Cholera reappeared in Algeria and Morocco during the summer, but on a slighter scale than in 1971, and was once again contained. Such virus diseases as measles, rubella and poliomyelitis are still not under control in large areas of the Region and several meetings were held to discuss preventive measures, including immunization.

19.28 In Morocco malaria transmission is continuing in many areas and there has been a resurgence in some that had been free from the disease for a considerable time, with an increase in the number of detected cases. A five-year plan has been drawn up to deal with this serious situation. In Algeria, 10 million of the 14 million inhabitants are covered by the malaria eradication campaign, which continues to make satisfactory progress. In Turkey, there are still occasional small outbreaks, particularly in frontier zones, and continued surveillance is needed.

19.29 A seminar on the evaluation of tuberculosis control programmes in countries with low prevalence and incidence was held in June in Copenhagen. Its recommendations will form the basis for future work in the Region in this field.

19.30 Increasing emphasis is being placed in the Region on public health ophthalmology, including the prevention of potentially blinding eye conditions. Efforts are being made to integrate the antitrachoma mass campaigns in Algeria, Morocco and Turkey into the basic health services.

19.31 Temporary population movements, involving tourists and migrant workers, are steadily increasing in the European Region. The fact that they have so far made only a relatively small contribution to the intercountry spread of disease shows the effectiveness of the Region's health services. Nevertheless, these movements present a public health hazard and it is

essential that the problem should be dealt with at the international level. The Organization has therefore initiated studies on the health aspects of labour migration and on public health aspects of tourism in the Region.

19.32 During the year, a new intercountry project on health laboratory services was started in order to strengthen the surveillance and control of communicable diseases.

Health statistics

19.33 In several Member States a common authority has been set up to administer both the health and social services, and efforts are accordingly being made to integrate health statistics with social and economic statistics in an overall health information system. ECE and WHO are collaborating in a study of this problem and held a joint working group on the subject in December. A symposium held at Windsor (United Kingdom) in May discussed the identification of individuals and population groups at high risk of disease or disability.

The Regional Committee

19.34 The twenty-second session of the Regional Committee for Europe was held from 18 to 22 September in Copenhagen, at the invitation of the Danish Government. It was the first session to be held in the new premises of the Regional Office and was attended by representatives of 30 Member States in the Region. Representatives of the United Nations, UNICEF, UNDP, ILO, the Council of Europe and several nongovernmental organizations also attended. The Director-General was present.

19.35 During the Regional Committee's consideration of his report for the period 1 July 1971 to 30 June 1972, the Regional Director drew attention to the role of WHO in helping countries to secure better administrative coordination in carrying out their health programmes. WHO had recently signed an exchange of letters with the Commission of the European Communities which should strengthen the Organization's position as a catalyst and coordinator of health services in Europe. Cooperation between WHO and different countries varied according to the size of the programmes, but those sponsored by UNDP, with WHO as executing agency, presented the Regional Office with one of its biggest administrative challenges. The report emphasized the importance of using managerial techniques and evaluation and of improving epidemiological work,

health statistics and health information. The Regional Committee commented on the need for improved communication between Member States and especially for prompt exchange of information concerning toxic agents and other health hazards.

19.36 The Committee reviewed progress reports on the long-term programmes in cardiovascular diseases, environmental pollution control and mental health and approved the introduction of the long-term programme in education and training, welcoming its emphasis on teacher training and continuing education. It endorsed the proposed programme and budget estimates for the Region for 1974 for transmission to the Director-General.

19.37 The Committee confirmed the decision to hold its twenty-third session in Vienna in 1973 and accepted an invitation from the Government of

Romania to hold its twenty-fourth session in Bucharest in 1974.

19.38 The Technical Discussions were on the public health aspects of organ transplantation. The Committee confirmed the selection of "Environmental factors in the etiology of chronic and degenerative diseases" as the subject for the Technical Discussions at the twenty-third session. "The health protection of the elderly" was chosen as the subject for the Technical Discussions at the twenty-fourth session.

19.39 The Committee also noted with satisfaction the excellent accommodation now available to the Regional Office in Copenhagen, expressed its thanks to the Danish Government for its generous assistance in providing the new premises and thanked those Member States that had generously contributed gifts for the building.

20. EASTERN MEDITERRANEAN REGION

20.1 The variety of climatic and topographical conditions in the Eastern Mediterranean Region, the different stages of development of the various countries, and even great variations between areas within individual countries, result in a diversity of health problems. The rapidly changing economic situation and growing urbanization and industrialization have added new problems—e.g., air, water and soil pollution—as well as increased recognition of others such as mental health disorders, cardiovascular diseases and cancer, to the traditional tasks of dealing with the communicable diseases, malnutrition and poor environmental conditions. The Organization's programme has been adapted to meet the changing circumstances, with emphasis on planning and due attention to coordination at all levels to achieve the best possible results with the resources available. Particular attention has been given to training, in view of the severe shortage of health manpower throughout the Region.

Disease prevention and control

20.2 The increase in the number of cases of smallpox recorded in the Region during the year was mainly a reflection of improved reporting. In Ethiopia, where eradication activities now cover the whole country, transmission seems to have been interrupted in 6 of the 14 provinces. In Sudan the eradication programme has been extended to cover the southern provinces, the area of high endemicity; and the incidence remained low in the north, where nearly all outbreaks were the result of importations from the southern parts or from Ethiopia. Smallpox transmission appears to have been interrupted in Afghanistan, where all reported cases were attributable to importation. Good progress has been made in the eradication programme in Pakistan, where transmission is now mainly confined to a major focus in the northern part of Sind Province and to areas receiving infection from this focus.

20.3 There was a marked decrease in the number of cholera cases reported and in the mortality rate from this disease. It is significant that public health administrators are recognizing that policies based on vaccination and restrictions on travel and food imports alone cannot prevent the spread of cholera into countries where the level of sanitation and

personal hygiene is low. The Organization provided assistance to several countries for the establishment of rehydration centres for the treatment of diarrhoeal diseases, including cholera.

20.4 In tuberculosis control programmes, the trend towards integration into the general health services was particularly marked in Afghanistan, Somalia and Yemen, as well as in Ethiopia and the Libyan Arab Republic, which received advice from WHO regarding comprehensive project evaluation.

20.5 With regard to malaria eradication, good progress was maintained in most programmes; for example, in the Syrian Arab Republic the introduction of new insecticides and administrative improvements have been followed by such a marked reduction in the incidence of malaria that its eradication now seems to be within sight. On the other hand, some programmes, such as those in Afghanistan and Pakistan, continued to be hampered by vector resistance to DDT and dieldrin, and by lack of financial resources to pay for more expensive alternative insecticides. The Government of Afghanistan is seeking UNDP assistance to enable it to buy malathion. WHO's assistance to all these programmes took the form of advisory services and the provision of some supplies.

20.6 Schistosomiasis is still a considerable problem, particularly with the extension of irrigation and other development schemes. The WHO-assisted schistosomiasis control projects in Egypt and Tunisia illustrated the general trend towards the combined use of chemotherapy and mollusciciding.

20.7 So far, mental health services have been somewhat neglected in most countries of the Region. The answers received from governments to a WHO questionnaire on this subject revealed a serious lack of appropriately trained personnel and a general slowness to develop effective treatment facilities for patients. A meeting of mental health experts was convened in September, when the situation was reviewed and a programme for future work outlined.

20.8 The cardiovascular diseases are demanding greater attention. Information on the prevalence of the major cardiovascular diseases, the facilities available in a number of countries and the action required

were discussed at the first regional seminar on the subject, held in Teheran in December, and assistance was provided to Egypt for the establishment of an intensive care unit at Alexandria University Hospital.

Environmental health

20.9 There is increasing recognition by governments of the importance of improving environmental sanitation as a means of preventing disease. During 1972 numerous requests were received by WHO for assistance with wastes disposal, community water supply and environmental pollution problems; on the other hand, the resources available were limited, though about 14% of the total funds used for all WHO-assisted activities in the Region were devoted to environmental health projects.

20.10 Despite the manpower and financial limitations, good progress was maintained in the community water supply programme, and most countries of the Region received some form of assistance from the Organization during the year for the development and improvement of water supplies. New methods for the control and prevention of water pollution—an increasing problem in the Region—were discussed during a regional seminar held in November in Khartoum. WHO provided assistance to Tunisia for a survey of water pollution, and to Iran and Iraq in assessing air pollution and formulating control measures. Assistance for the training of sanitary engineers and sanitarians was also furnished to a number of countries, and the fourth regional refresher course for sanitarians was started in Damascus in May.

20.11 In the field of radiation protection, many institutions in the Region are now participating in the IAEA/WHO dosimetry service for cobalt teletherapy units, and selected users in 10 countries are using the film-badge service started in 1968 for the monitoring of personnel occupationally exposed to ionizing radiation. Medical X-ray inspectors from 11 countries of the Region attended a course held in Nicosia in October. They were provided with a set of testing instruments for use in radiological health surveys in their own countries.

Strengthening of health services

20.12 There has been a marked increase in interest in improving public health administration and health planning, and most countries of the Region have now drawn up national health plans, usually as part of comprehensive plans for socioeconomic development. The need for this is reinforced by increasing urbanization on the one hand and, on the other, by the fact that

in some countries rapid economic progress is altering the way of life in rural areas: education and health facilities, social and agricultural extension services and potable water are being extended to villages which have long suffered from material deprivation and geographical and cultural isolation. Health personnel from nine countries of the Region received training in health and manpower planning during a course held in Teheran and Alexandria at the end of 1971 and the beginning of 1972. The course covered the principles of socioeconomic and manpower planning; research on, and evaluation of, public health programmes and practices; and the management of health organizations and institutions.

20.13 Countries are paying considerable attention to the development of their basic health services; WHO assisted a number of projects in this field at the community, provincial and national levels. Many of these projects benefit from UNICEF assistance, and in some cases UNDP support is provided.

20.14 Three countries have taken advantage of the opportunities offered by UNDP for large-scale projects to develop their health laboratory services and have included such projects in their country programmes. In the Region generally, the health laboratory services are undertaking more virological work and support for epidemiological surveillance activities.

20.15 There is growing recognition of the importance of vital and health statistics for sound planning, administration and evaluation of health services, and the Organization assisted a number of country projects for the improvement of statistical services. It also provided advice on medical records in hospitals and health centres through a UNDP-supported inter-country project.

20.16 In close collaboration with UNDP, UNICEF and FAO, the Organization continued to promote a number of projects to combat malnutrition, for instance, through applied nutrition programmes (as in Pakistan and Sudan) and promotion of the development or use of protein-rich weaning foods (as in Egypt, Iran, Libyan Arab Republic and Tunisia). A UNDP/FAO/WHO mission assessed the status of the jointly-assisted food and nutrition programme in Yemen, where WHO also carried out an initial clinical and anthropometric survey of infants and schoolchildren.

20.17 Some countries in the Region that have large-scale family planning programmes mainly financed from national budgets also receive UNFPA funds and WHO assistance for research, maternity-centred

family planning and training (mainly through fellowships and help in organizing national seminars). Other countries, too, are showing a growing interest in the health aspects of family planning; here, also, the maternity-centred approach is taken, and help is given in the preparation of programmes and requests for UNFPA assistance.

Health manpower development

20.18 The training of health personnel remains one of the most important problems in the Region. A group meeting was held at the Regional Office in March to review the progress made in medical education since the Second Regional Conference on Medical Education, held in Teheran in December 1970. Particular attention has been paid to achieving a clearer definition of educational objectives, so that training might be more closely related to countries' health needs. The Organization continued to provide assistance for the development of the Medical Faculty of Haile Sellassie I University, Addis Ababa. On the other hand, the project for community-oriented education at the Faculty of Medicine, Aleppo, Syrian Arab Republic, terminated during the year, with the cessation of UNDP financial support. There continued to be a large number of exchanges under the WHO-assisted project for the exchange of professors of medical faculties and schools of public health in the Region; it is interesting that there has been a tendency for young teachers who have been trained abroad in modern techniques to move from new schools to older-established schools, whereas in the past the movement was almost exclusively in the opposite direction. With regard to community medicine, students now spend part of their training period at a rural health teaching centre. A significant development during the year was the establishment of a regional teacher training centre at the Faculty of Medicine, Pahlavi University, Shiraz, Iran. The first course, for medical educators from four countries, was held in September.

20.19 Increased emphasis was placed on the training of auxiliary health personnel, and multidisciplinary training programmes were carried out in a number of countries. It was encouraging to note that more health authorities were able to select personnel with higher basic educational qualifications to participate in most of the WHO-assisted training programmes.

20.20 Particular stress continued to be laid on the training of nurses and nursing auxiliaries, and several countries received assistance in reviewing systems of postbasic education for nurse educators and administrators.

20.21 The WHO fellowships programme remained one of the most important aspects of the training programme, the policy of placing fellows as far as possible within the Region itself being continued.

The Regional Committee

20.22 Sub-Committee A of the Regional Committee for the Eastern Mediterranean met in Amman from 11 to 14 September 1972. Sub-Committee B did not meet.

20.23 The meeting of Sub-Committee A was attended by representatives of Afghanistan, Bahrain, Cyprus, Egypt, Ethiopia, France, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, and Yemen. UNDP, UNICEF, UNRWA, ILO and FAO were represented, as were five international nongovernmental and intergovernmental organizations. An Assistant Director-General of WHO represented the Director-General.

20.24 In the discussion on the Regional Director's Annual Report for the period 1 July 1971 to 30 June 1972, there was general agreement with the continuing emphasis on the four major aspects of health activities—the strengthening of health services, training of health manpower, control of diseases, and promotion of environmental health. Stress was laid on the importance of promoting a widespread understanding of the need for balanced socioeconomic development; health authorities had to compete with other government agencies for a rational allocation of scarce resources and, in order to provide a valid argument for increasing the allocation of national and international funds to the health sector, an impartial evaluation of national health programmes was required. It was also considered essential that ministries of health be well represented in national planning bodies.

20.25 Attention was drawn to sources of financing in addition to the WHO regular budget and UNDP (through which WHO was actively collaborating in 32 multidisciplinary projects, many with community development objectives), such as IBRD, the World Food Programme, and UNFPA.

20.26 The need to develop health manpower at all levels was repeatedly stressed, and the high priority accorded by the Organization to work in this field—through the provision of teachers for medical schools and other health training institutes, fellow-

ships, technical advice, and supplies and equipment—was welcomed.

20.27 The proposed programme and budget estimates for the Region for 1974 were endorsed for transmission to the Director-General.

20.28 A document on hospital planning with reference to bed requirements formed the basis of a lively discussion, during which representatives outlined the situation in their individual countries, referring to various aspects affecting this planning, such as the

movement of nomadic populations and cultural reactions to hospitalization.

20.29 Sub-Committee A confirmed its previous decision to hold its 1973 session in the Syrian Arab Republic, and accepted an invitation from the Government of the United Arab Emirates to meet in that country in 1974.

20.30 “The WHO fellowships programme in the Eastern Mediterranean Region” was the subject of the Technical Discussions.

21. WESTERN PACIFIC REGION

21.1 An important event was the decision taken by the Twenty-fifth World Health Assembly to recognize the representatives of the Government of the People's Republic of China as the only legitimate representatives of China to the World Health Organization.

21.2 With the admission of Fiji, which became a Member of the Organization during the year, the Region now comprises 13 Member States and one new Associate Member, Papua New Guinea, as well as territories under the responsibility of Member States outside the Region.

Communicable diseases

21.3 Communicable diseases still account for much sickness and disability and many deaths in a number of the developing countries in the Region. Plague, which remains endemic in the Republic of Viet-Nam, reappeared in the Khmer Republic for the first time for several years. The number of reported cholera cases increased in several countries, and the incidence of typhoid fever rose in the Philippines and the Republic of Korea. The Region has, however, remained free from smallpox.

21.4 Some progress was made in organizing epidemiological surveillance services despite the lack of national staff and the relatively weak statistical and health laboratory services in a number of countries of the Region. Continued WHO assistance in epidemiology is required, if further progress is to be made.

21.5 Tuberculosis mortality has declined in most countries, but this disease is still a serious threat, particularly in the developing ones. BCG vaccination of infants and preschool children is the major weapon used; no fewer than 12 million children were vaccinated with BCG during the year. The quality of the BCG vaccine produced in countries of the Region is ensured by the regular provision of seed lot strains to the laboratories concerned. Group training activities were organized at the tuberculosis course jointly sponsored by the Government of Japan and WHO in Tokyo.

21.6 In the absence of more effective chemotherapeutic agents or a vaccine, progress in leprosy control remained slow. Moreover, a large portion of the generally inadequate funds available still has to be

spent on the institutional care of leprosy patients who are reluctant to be discharged or return to their homes.

21.7 Antimalaria activities in the Region progressed steadily. The International Malaria Eradication Training Centre in Manila provided training for 104 health workers from the South-East Asia, Eastern Mediterranean and Western Pacific Regions.

21.8 In view of the prevalence of insect-borne diseases in the Region and the risks associated with the use of insecticides, efforts are being made to interest governments in establishing vector control units within their health services.

Noncommunicable diseases

21.9 The true situation with regard to cancer in the Region has not been clearly determined, but the numbers of deaths from this cause that are registered is increasing. Assistance was given in assessing the cancer problem and studying the feasibility or effectiveness of cancer control services in two countries.

21.10 Interest in developing national dental health services was stimulated by a regional workshop on dental health services, held in Singapore in May, and assistance was provided in reviewing the dental health situation in a number of countries. There were no WHO-supported programmes in drug dependence in the Region in 1972, but the growing concern in practically all countries about the seriousness of this problem, particularly among the younger age-groups, was reflected in a resolution adopted by the Regional Committee in September-October¹ (see paragraph 21.34).

Promotion of environmental health

21.11 High priority was given to programmes in the developing countries and territories for improving basic community sanitation and community water supplies, planning waste disposal, and strengthening environmental health services and institutions. An increasing number of requests was received from countries for assistance in various aspects of pollution control (see also paragraph 21.40).

21.12 Following the catastrophic floods in Central Luzon in July and August, WHO assisted the Philip-

pine Government in determining emergency needs for medicines and water purification chemicals, evaluating sanitary conditions and formulating relief and rehabilitation projects. The Organization provided culture media and helped the Government to purchase supplies for the production of vaccines, notably against cholera.

21.13 A number of countries received assistance in radiation protection, medical physics, and the maintenance and repair of X-ray equipment.

21.14 WHO's assistance in occupational health, which is a relatively new activity in the Region, was focused on the orientation of national health staff with regard to the type of services that can usefully be developed in countries and territories of the Region. In seminars on this subject that were organized in 1972 in the Republic of Korea and in Singapore, emphasis was placed on occupational health and safety in small-scale industries. While WHO and ILO assistance in developing a broad national programme on occupational health and safety in the Philippines was concluded—recommendations being made concerning the respective responsibilities—a new industrial health development programme was formulated for the Ministry of Labour, Singapore.

Strengthening of health services

21.15 The grouping of health services development projects under a master plan of operation was completed in Malaysia and Tonga. This brings the number of countries or territories with such plans to eight. These WHO-assisted projects continue to focus on the coordination of specialized programmes and their integration into the general health services.

21.16 Operational research activities have been impeded by the shortage of trained personnel, the unavailability of baseline data and the lack of a standard field operating procedure. In Malaysia, however, a health practice study which started in 1968 was completed in June 1972. The report on the study will be taken into account for the mid-term review of Malaysia's second five-year development plan.

21.17 The fifth in a series of regional courses on health planning was conducted in collaboration with the University of the Philippines Institute of Public Health. To date, 53 persons have been trained in these courses.

21.18 Assistance in planning for health services has hitherto been confined to the preparation of national health plans and the training of personnel. A new

element added during the year is the use of the method of systems analysis in the formulation of development projects. A workshop was held in Singapore and a formulation exercise carried out to develop an information system and to define the role of a research and statistics unit at the ministry of health level. The exercise resulted in a proposal by the Ministry of Health, Singapore, for the development of a health information system. Assistance was also given to the Government of Malaysia in applying systems analysis to planning health services for a regional land development project in Pahang Tenggara. The resulting project proposal was approved by a steering committee representing the various ministries involved. A number of WHO staff in the Western Pacific Region participated in both these exercises.

21.19 A revised planning manual for teachers and a field manual for use in planning work have been prepared. The field manual will be more closely adapted to field requirements after further tests in a demonstration area in the Philippines.

21.20 Increasing interest has been shown in projects for strengthening medical care services, particularly in hospitals. The assistance requested covered a wide range of activities, including hospital design and management, improved medical facilities; reviewing hospital records; organizing hospital departments in plastic surgery, cardiothoracic surgery and gastroenterology; and training staff for them. Assistance was also given for rehabilitation services and for training in physical and occupational therapy, prosthetics and orthotics.

21.21 Assistance or advice in the organization and management of health laboratory services, the training of scientific and technical laboratory helpers, and the establishment of a more balanced and coordinated laboratory service to meet the needs of medical and health services was given to seven countries and territories. Assistance was also provided in the production and control of biological substances. A number of countries in the Region have joined the programme undertaken by WHO and the Center for Disease Control, Atlanta, Ga., USA, (in its capacity as WHO International Reference Centre for the Serology of Treponematoses) to assist laboratories in the quality control of serological testing for syphilis.

21.22 Nursing activities were spread over 32 projects in one or another of the following areas: general health services development, education and training programmes, family health, communicable disease control, and other specialized nursing work. Activities in basic nursing education were expanded and mid-

wifery studies were increasingly being incorporated in the nursing curriculum so that nurses may be prepared in a shorter period of time. There is also a trend to prepare the auxiliary nurse-midwife for a multipurpose rather than a single-purpose role. On the other hand, there has been little demand for WHO assistance in special subject areas such as psychiatric and occupational health nursing.

Health statistics

21.23 During the year, assistance was provided to develop or upgrade the health statistics, health records and reporting services of several national health administrations and to extend services for the support of epidemiology projects. In the South Pacific, an intercountry project assisted in improving national health statistics and medical records, and advice was provided on demography and related matters connected with family planning.

Family health

21.24 The trend to incorporate health education activities in family health projects and to integrate both in the basic health services was strengthened in 1972. Health education specialists were included in intercountry family planning teams and assisted in preparing education and information materials on family health. At the national level, WHO health education staff helped to develop community health services.

21.25 WHO supported the establishment of family welfare projects that include components of maternal and child health, health education, nutrition and family planning. The availability of UNFPA funds enabled WHO to expand its advice and assistance to many countries undertaking comprehensive projects in family health. In addition the Organization was able to help governments in planning and formulating comprehensive requests for UNFPA assistance. Emphasis was given to the training of staff at all levels, through group educational meetings, seminars and courses at intercountry as well as national levels. A feature common to many WHO-assisted projects with a multidisciplinary approach is the provision of nutrition training for several categories of health workers. A public health nutritionist was included in the intercountry team that assists governments in developing education and information materials in family health.

Health manpower development

21.26 The multidisciplinary approach was also reflected in the broad-based education and training

projects supported by WHO during the year. Emphasis is placed on assistance to single projects covering several fields rather than to separate projects in, for example, medical education or nursing education. Health workers thus receive an early indoctrination in the team concept, and training facilities and teaching staff can be shared.

21.27 Many teaching institutions have now reached the stage of development where they need short-term advisory services in specific areas rather than long-term assistance in broad fields. However, in certain countries where counterpart teaching staff are lacking the Organization has continued to provide long-term advisers to engage in full-time teaching. In these countries, the provision of fellowships for the training of counterparts is being given priority.

21.28 In response to the need to develop teacher training facilities for instructors in the health sciences, WHO has reached an agreement with the Government of Australia to establish a regional teacher training centre in the University of New South Wales, Sydney. WHO's regular funds as well as UNDP funds will be used to develop the project. In 1972, several of the centre's staff were afforded training and orientation under WHO sponsorship at the Center for Educational Development in Chicago, USA. WHO also supported several national workshops in teacher training.

21.29 Fellowships designed to train national health workers have formed an essential part of practically all WHO-assisted projects. Priority was given to fellowships for teachers in training institutions.

Prophylactic and therapeutic substances

21.30 An increasing number of requests was received for help in assessing current drug control practices; for instance, assistance was provided to the Philippines in preparing a project document for submission to UNDP for financial assistance to strengthen the Food and Drug Administration of the Department of Health and interim measures were recommended to regulate the manufacture and distribution of drugs, to provide physical and technical facilities for the Food and Drug Administration headquarters and to train national staff for critical posts.

The Regional Committee

21.31 The twenty-third session of the Regional Committee for the Western Pacific was held in Agana, Guam, from 27 September to 5 October 1972. The

meeting was attended by the representatives of 15 Member States, including those responsible for territories in the Region, and of Papua New Guinea, a new Associate Member. Representatives of the United Nations, of UNDP and of three nongovernmental organizations in official relations with WHO were also present. The Committee decided that Chinese should become an official language of the Committee.

21.32 In the discussion on the Annual Report of the Regional Director for the period 1 July 1971 to 30 June 1972 a number of representatives provided the Committee with information on the progress of their national health programmes and spoke of the action being taken to deal with environmental problems. Particular mention was made of WHO's work in strengthening epidemiological services, organizing epidemiological surveillance and coordinating health services, and appreciation was expressed of its support of communicable disease control, environmental health and family health activities, and of its assistance in training health personnel. The proposed regional programme and budget estimates for 1974 were reviewed by the Committee and approved for transmission to the Director-General. The Committee also reviewed the modifications made to the 1972 and 1973 programme and budget estimates and a tentative budgetary projection for 1975.

21.33 The Committee reviewed a report on the action taken by the Regional Director on the disinsection of aircraft. It noted that most countries and territories in the Region required aircraft disinsection on international flights and that all but one would accept the vapour disinsection system if that were recommended by the World Health Assembly. The Committee noted with concern that in a study carried out in Japan on sanitation in aircraft a high proportion of samples of drinking-water was found not to meet the international quality standards established by WHO. The Committee adopted a resolution urging the health agencies of Member States in the Region to ensure that the quality of drinking-water and ice used for international flights should meet the established standards, and requesting the Director-General to submit this important matter to Member States in other WHO Regions. A further resolution was adopted requesting the Regional Director to obtain information on the safeguards currently in effect to control the quality of food served on international flights and on any studies done in Member States to assess the related risk of food-borne diseases.

21.34 The Committee adopted a resolution requesting the Regional Director to formulate for submission to

the Director-General a proposal for a pilot study in selected countries of the Region, which might possibly be financed by the United Nations Fund for Drug Abuse Control, and which could lead to a long-term programme to determine the epidemiology of drug abuse in the Region and the availability of facilities for treatment, rehabilitation and research.

21.35 The Committee reviewed a report by the Regional Director on the survey undertaken on long-term planning in the field of health, including long-term financial indicators. It was evident that such health plans as existed in the 27 countries or territories that had provided information were in an early stage of development. The Committee adopted a resolution reiterating the hope that governments in the Region would prepare viable national health plans, and would improve and update them regularly. The Regional Director was asked to continue to offer assistance to governments to develop their own capacity for planning.

21.36 Reviewing the second progress report on regional activities in environmental pollution control, the Committee noted that there was an evident need in a number of countries for additional financial support to environmental pollution control programmes and for additional resources in personnel. It noted with concern the reduction in UNDP funding for the long-term programme in environmental health and adopted a resolution recommending that Member States should expand their own environmental pollution control programmes and explore the possibility of funds being provided for this purpose from sources other than WHO.

21.37 The Committee noted that agreement had been reached with the Australian Government and the University of New South Wales on the establishment of a regional centre for teacher training (see paragraph 21.28) and expressed satisfaction that UNDP had agreed to provide additional funds for the centre.

21.38 The Committee urged governments in the Region to take advantage of the facilities offered by the WHO Serum Reference Bank in Tokyo.

21.39 The Committee confirmed that the twenty-fourth session of the Regional Committee would be held in New Zealand from 28 August to 5 September 1973. It also accepted the offer of the Government of Malaysia to act as host for the twenty-fifth session. The Committee decided that the question of reverting to the practice of holding alternate sessions at

regional headquarters should be placed on the agenda of the Committee's twenty-fourth session.

21.40 The theme of the Technical Discussions was "Environmental pollution problems and approach

to their control in the Western Pacific Region". The Committee selected "The role of the hospital in the community and the financing of hospital-based medical care" as the topic for the Technical Discussions in 1973.

PART III

PROJECT LIST

PROJECTS IN OPERATION IN 1972

This part of the Annual Report contains a list of projects in operation for the whole or part of the period from 1 December 1971 to 30 November 1972. It does not include projects in which the only WHO assistance given during the period was technical advice from headquarters or regional offices, or projects concerned only with the award of fellowships. (The numbers of fellowships awarded in 1972, by subject of study and by Region, are given in Annex 7.)

The dates following the project title indicate the duration of assistance to the project, whether such assistance is continuous or intermittent. For projects not completed during the period under review, the date of estimated termination has been given (in italics) where possible.

For projects—or phases of projects—completed during the period, details of the assistance provided by the Organization and a brief description of the work done between the dates indicated are given. For continuing projects such details have not as a rule been included.

As in former Annual Reports, an attempt has been made to summarize the immediate results of completed projects and, where the nature of the work has permitted, to show the extent to which the objectives of the projects have been achieved.

The projects are grouped by Region in the following order: Africa, the Americas, South-East Asia, Europe, Eastern Mediterranean, and Western Pacific. In order to present a balanced account of the health programme in the Americas, the list for that Region includes the projects assisted by the Pan American Health Organization (PAHO) in addition to those assisted by WHO. For each Region, projects in individual countries are given in the alphabetical order of countries; intercountry projects follow, under the acronyms AFRO, AMRO, SEARO, EURO, EMRO and WPRO. For the Eastern Mediterranean Region, where the project numbers have been changed, the old project numbers are shown in parenthesis. Interregional projects are listed at the end of this part of the Annual Report.

The abbreviations used for sources of funds are as follows:

R	WHO regular budget	PM	PAHO Special Fund for Malaria Eradication
UNDP	United Nations Development Programme	PN	Grants and other contributions to the Institute of Nutrition of Central America and Panama
UNDP/UN	Funds-in-trust received from United Nations, ILO or FAO as executing agency for UNDP-assisted projects	PS	PAHO Special Fund for Research
UNDP/ILO		PT	PAHO Textbook Fund
UNDP/FAO		PW	PAHO Community Water Supply Fund
FT	Funds-in-trust (other than above)		
UNFPA	United Nations Fund for Population Activities		
UNFDAC	United Nations Fund for Drug Abuse Control		<i>Voluntary Fund for Health Promotion</i>
WI	Fund of the United Nations for the Development of West Irian	VC	Special Account for the Cholera Programme
		VD	Special Account for Miscellaneous Designated Contributions
		VL	Special Account for the Leprosy Programme
		VM	Malaria Eradication Special Account
		VR	Special Account for Medical Research
		VS	Special Account for Smallpox Eradication
		VW	Special Account for Community Water Supply
		VY	Special Account for the Yaws Programme
<i>Pan American Health Organization</i>			
PR	PAHO regular budget		
PG	Grants and other contributions to PAHO		
PH	Pan American Health and Education Foundation		
PK	PAHO Special Fund for Health Promotion		

Names or acronyms of any other agencies or entities cooperating in a project are given in parenthesis after the source(s) of funds.

AFRICAN REGION

Botswana

4001 Development of basic health services (1969-) R UNDP UNFPA UNICEF—To develop basic health services, giving particular attention to the epidemiological surveillance and control of communicable diseases and to maternal and child health, including family planning; and to incorporate the teaching of public health in training programmes for health personnel.

Burundi

1001 Epidemiological services (1972-) R UNDP—To develop an epidemiological service that will plan, coordinate and evaluate programmes for the surveillance and control of communicable diseases, including smallpox; to strengthen the vital and health statistics service; and to train personnel.

1801 Smallpox eradication (1967-) R VS—In conjunction with project Burundi 1001 (see above), to carry out maintenance and epidemiological surveillance work, and to evaluate the programme.

3301 Master plans for sanitation and drainage, Bujumbura (1972-) UNDP—To make engineering studies for the preparation of master plans and phased investment plans for sewerage, drainage and solid wastes disposal systems for Bujumbura, and to formulate policy on related legal, managerial and financial matters.

4001 Development of basic health services (1969-) R UNDP UNICEF—To plan the health services and improve basic health services, with emphasis on improvement of family health and nutrition, training of nurses and sanitation staff, and training of health staff in health education techniques. The work of the community water supply project Burundi 3201 is continuing under this project.

4201 Health laboratory service (1971-) R—To establish and develop a blood bank in Bujumbura.

6201 Medical school, Bujumbura (1972-) R—To develop the medical school of the University of Bujumbura.

Cameroon

4001 Development of basic health services (1968-) R UNDP UNICEF—To develop basic health services and train the necessary personnel; to evaluate progress of the mass malaria chemotherapy campaign in schoolchildren, carry out epidemiological investigations of malaria and continue geographical reconnaissance in areas in which basic health services are to be further developed; to improve environmental health; and to strengthen and expand nursing services, in continuation of the work previously carried out under project Cameroon 4401.

4002 Health services (1961-72) UNDP—To reorganize and strengthen the health services in West Cameroon.

4402 Nursing schools, Ayos, Bamenda and Garoua (1969-) R—To further the training of student nurses in public health

through financial support of the three nursing schools at Ayos Bamenda and Garoua.

6201 University Centre for Health Sciences, Yaoundé (1966-) UNDP—To develop the Centre, which trains professional and auxiliary health personnel.

Central African Republic

1801 Smallpox eradication (1969-) R

3301 Sanitation and drainage, Bangui (1969-) UNDP—To plan and implement a sanitation and drainage programme for the residential districts of Bangui and to train municipal sanitation workers.

4001 Development of basic health services (1969-) R UNDP UNICEF—To develop the basic health services, train health staff of all categories, and plan and implement a long-term sanitation programme.

4401 Nursing education (1966-) UNDP—To upgrade and develop the basic nursing education programme at the Bangui school of nursing.

Chad

1801 Smallpox eradication (1968-) R

4001 Development of basic health services (1964-) R UNDP UNICEF—To strengthen and develop the basic health services in urban and rural areas, with emphasis on maternal and child health; to plan and carry out a long-term sanitation programme; and to train health personnel.

4401 Nursing education (1962-74) R UNICEF—To develop the national school of nursing and revise the training programme for nursing auxiliaries.

Comoro Archipelago

4001 Development of basic health services (1970-) R—To develop basic health services, carry out mass campaigns against yaws and syphilis, complete the study of malaria epidemiology, and plan antimalaria measures suited to existing conditions.

Congo

4001 Development of basic health services (1965-) R UNICEF—To organize health services, with emphasis on maternal and child health care, tuberculosis control, environmental health, health education and nutrition, and to train health staff.

4401 Nursing education (1967-) R UNICEF—To strengthen programmes for the training of nurses, midwives and medico-social workers at Pointe-Noire.

Dahomey

1801 Smallpox eradication (1967-) R

Dahomey (continued)

3001 Health component, agricultural survey and demonstration in the Ouémé Valley (1971-72) UNDP/FAO—A consultant (malacologist) (January-March 1971) made studies of the prevalence of schistosomiasis and the biology of the vector in the project area and recommended measures for the control of the disease. Another consultant (sanitary engineer) (January-April 1971; January-February 1972) gave assistance in connexion with the work carried out on community water supplies.

4001 Development of basic health services (1968-) R UNICEF—To develop the basic health services, including maternal and child health care; to develop an environmental sanitation programme in urban and rural areas; to train health personnel of all categories; and to improve methods and facilities for the diagnosis, treatment and control of malaria.

4201 Health laboratory services (1970-) R—To develop the services.

4401 Nursing education (1969-) R—To revise and develop basic education programmes for nurses and midwives at state-diploma level, and for auxiliaries.

Equatorial Guinea

4001 Consultant services (1969-) R—To plan and develop health services, giving particular attention to general administration, medical care, environmental health, the training of health personnel of various categories and the improvement of basic health services.

4002 Operational services (1969-) R—To operate preventive and curative health services and train health personnel of various categories.

Gabon

3301 Master plans for sanitation and drainage, Libreville (1972-) UNDP—To make engineering studies for the preparation of master plans and phased investment plans for sewerage, drainage and solid waste disposal systems for Libreville, and to formulate policy on related legal, managerial and financial matters.

4001 Development of basic health services (1969-) R—To develop the basic health services, with emphasis on maternal and child health, plan and implement a long-term sanitation programme, and train health personnel.

4401 Nursing education (1961-) R—To develop basic programmes for the training of professional and auxiliary nurses.

Ghana

2101 Schistosomiasis control (1959-72) UNDP—To carry out a pilot schistosomiasis control programme based on the results of previous studies on snail intermediate hosts and local epidemiology of the disease; and to study the risks of spread of the disease. This project, originally planned to end in 1971,¹ was continued for another year, to enable the cost of the operation to be assessed. Provided in 1972—an epidemiologist.

3001 Environmental sanitation (1971-) R—To strengthen the central environmental health unit, plan a long-term sanitation programme including the development of water supplies, and train personnel.

3002 Health component in Volta Lake research project (1969-) UNDP/FAO—To conduct research as a basis for planning and coordinating control measures against waterborne parasitic diseases and to develop a general public health programme for the project area.

3201 Master plan for water supply and sewerage for the Accra-Tema metropolitan area (1963-72) UNDP—To give technical assistance to the Ghana Water and Sewerage Corporation for the Accra-Tema water supply and sewerage scheme, and to train personnel for responsible positions in the Corporation. Provided—a project manager for three years, two consultants, visits by Regional Office and headquarters staff members, contractual services, fellowships, and supplies and equipment.

A study of water supply and sewerage in Ghana was made by a team of experts sent by WHO in 1960. A request for assistance from the United Nations Special Fund, submitted in 1962, was approved in 1963 and the first phase of the project (Ghana 11) began. WHO selected and commissioned consulting engineers to prepare a master plan, and management consultants to assist in establishing the Ghana Water Resources Development Corporation, which later became the Water and Sewerage Corporation. In 1964, in view of the rapidly increasing urgency of water supply demands a further request was submitted for a contingency allocation to finance the preparation of an engineering and feasibility report and of documents to support the application for a loan from an international lending agency. The request was approved and the revised plan of operation came into effect in 1965. Meanwhile the master plan was prepared for implementation in several stages up to the end of the century, and the management consultants' report and operation manuals were completed. Work on the additional engineering and feasibility study was completed in 1966.

A second phase (Ghana 0019) was approved by UNDP in 1967 to last from 1968 to 1970. It consisted of contractual services for the preparation of detailed engineering designs and tender documents for the second stage of implementation of the master plan with respect to water supplies (1972-1976), and the first stage with respect to sewerage—in particular the detailed topographical survey of the proposed sewer alignments, and new plans for marine outfall. The same subcontractors were retained by WHO for this phase. The project manager's work ended in 1970, but the further contractual services of three experts were provided, under the extended second phase, for assistance in management of the Ghana Water and Sewerage Corporation concurrently with the start of the construction programme assisted by the International Development Association.

Training was an important part of WHO assistance to the project: seven long-term fellowships for studies in sanitary engineering were awarded in 1964; five short-term fellowships for studies in water utility management or waterworks administration and one for a year on supply systems, in 1967; and 16 long-term fellowships on subjects including water supply and sewerage design, construction and maintenance, meter repair and testing, and general and financial management, between 1968 and 1971.

The project achieved the aims outlined in the plan of operation; Accra's existing network was improved after leakage surveys and flow analysis, the designs for new water supply and sewerage systems under the master plan for Accra and Tema were completed ready for construction; and the Ghana Water and Sewerage Corporation was established and staffed with qualified personnel.

3202 Rural water supply and environmental health (Aug.-Oct. 1972) UNDP—In connexion with the rural water supply scheme, and as a part of pre-project preparatory activities, a consultant

¹ For work done up to and including 1971, see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 263.

supervised the installation of spare parts and the adjustment of drilling rigs, gave in-service training to drilling staff and prepared a drilling maintenance and operation manual. The project document has been prepared and is under consideration by the Government and UNDP; when approved, full project activities will be initiated.

4401 Postbasic nursing education (1963-) R—To develop postbasic nursing education in the University of Ghana.

4501 Health education (1967-) UNDP—To survey the health education facilities and develop a long-term plan for the extension of health education services throughout the country.

6201 Medical school, Accra (1968-) R—To strengthen the faculty and improve the teaching facilities.

Guinea

1802 Smallpox eradication (1969-) R

2201 Onchocerciasis control (1967-) R—To carry out epidemiological and entomological studies of onchocerciasis and to draw up and implement a programme for the control of the disease.

4001 Development of basic health services (1968-) R UNDP UNFPA UNICEF—To evaluate progress in the development of rural health services in the demonstration areas and bring the services to the level required to support mass campaigns against malaria and other diseases; to extend to the whole country the facilities for the diagnosis and treatment of malaria and carry out antimalaria work; and to develop a sanitation programme.

6201 Medical school, Conakry (1969-) R—To develop the medical school.

Ivory Coast

3201 Water supply and sewerage, Abidjan (1970-) R UNDP—To formulate an immediate programme for sewerage and storm drainage of the priority area in Abidjan, carry out surveys and special studies preliminary to the preparation of master plans for water supply, sewerage and drainage for Abidjan, and train personnel.

4901 Vital and health statistics (1963-66; 1968; 1970-) UNDP—To develop the vital and health statistical unit of the Ministry of Public Health and train personnel at the National Institute of Statistics.

5101 Maternal and child health services (1964-) R UNICEF—To strengthen maternal and child health work, organize a national BCG vaccination campaign, and train auxiliary health personnel and social workers.

Kenya

1001 Epidemiological services (1971-) R UNDP—To develop an epidemiological service that will plan, coordinate and evaluate programmes for the surveillance and control of communicable diseases, including tuberculosis and smallpox; to strengthen the vital and health statistics service; and to train personnel.

1801 Smallpox eradication (1968-) R—In conjunction with project Kenya 1001 (see above), to implement the eradication programme and arrange for its independent assessment, and to develop epidemiological surveillance.

3001 Public health engineering education (1971-) R—To strengthen the teaching of public health engineering at the Faculty of Engineering, University of Nairobi.

3202 Sectorial study and national programming for community and rural water supply, sewerage and water pollution control (1971-) FT (Swedish International Development Agency)—To carry out sectorial studies and design a national programme for community and rural water supply, sewerage and water pollution control.

3301 Sewerage and groundwater survey, Nairobi (1971-) UNDP—To make engineering and feasibility studies required for the preparation of master plans, phased investment studies and a construction programme for sewerage, storm drainage and solid wastes disposal for Nairobi; to carry out groundwater investigations for increasing the Nairobi water supply; and to train personnel.

4001 Basic health services (1962-) R UNFPA UNICEF—To strengthen and develop the basic health services, integrate into them services for family health, public health nursing, nutrition and environmental sanitation and train health personnel. The former environmental sanitation and nutrition projects (Kenya 3201 and 5601) have been incorporated in this project.

4401 Postbasic nursing education (1967-) R—To develop postbasic nursing education at the University of Nairobi in order to train nurse tutors and administrators.

6101 Medical training centre (1970-) R—To develop the centre, which trains health personnel.

6201 Medical school, Nairobi (1965-) R—To develop the medical school.

Lesotho

4001 Basic health services (1968-) R UNDP UNICEF—To establish integrated basic health services in urban and rural areas, with emphasis on maternal and child health care, public health nursing, environmental health, organization of laboratory services and training of personnel.

Liberia

1001 Epidemiological service (1968-) R UNDP—To develop an epidemiological service that will plan, coordinate and evaluate programmes for the surveillance and control of communicable diseases, and to establish a vital and health statistics unit in the National Public Health Service.

1801 Smallpox eradication (1968-) R

3201 National community water supply programme (1972-) UNDP—To develop an operational institution, under the Public Utilities Authority, capable of managing, administering and operating public water supply and sewerage facilities; to prepare investment projects and plans for design and construction of water supply and environmental sanitation works for a limited number of communities; to implement a leakage detection programme for Monrovia; and to train personnel.

4001 Development of basic health services (1968-) R UNICEF—To develop basic health services in accordance with the national health plan, with emphasis on strengthening the facilities that can support mass campaigns against communicable diseases and into which maternal and child health activities can be integrated; to train health service personnel, develop laboratory services and carry out antimalaria work.

4701 Radiological services (1972-) R—To strengthen the radiological services at the John F. Kennedy Memorial Medical Centre and train the necessary staff.

Liberia (continued)

6201 Medical school, Monrovia (1969-) R—To develop the medical school.

Madagascar

3201 Water supply and sanitation, Tananarive (1971-) UNDP—To carry out a pre-investment study for expansion and improvement of the water supply and for sewerage and solid wastes systems in Tananarive; and to make a national study of the water supply sector.

4001 Development of health services (1968-) R—To organize health services, with emphasis on maternal and child health, sanitation, nutrition and health education work; to integrate specialized activities into the general health services; and to train health personnel.

Malawi

1801 Smallpox eradication (1968-) R VS—To implement the eradication programme and develop epidemiological surveillance.

4001 Development of basic health services (1970-) R UNDP—To develop the health services, with emphasis on maternal and child health, epidemiological surveys of communicable diseases, and national health planning.

4801 Physical rehabilitation services (1969-) R—To set up a workshop for the production of orthopaedic appliances and to train staff.

Mali

1801 Smallpox eradication (1965-) R

3201 Drainage system for Bamako and water supply for selected provincial towns (1971-) UNDP—To formulate a staged programme for sewerage and storm drainage for Bamako, carry out water supply studies for selected provincial towns, and train personnel.

4001 Development of basic health services (1969-) R VC—To implement the national health plan, particularly as regards development of a network of basic health service facilities that can support mass campaigns against communicable diseases and assume responsibility for maternal and child health care; and to improve methods for the diagnosis and treatment of malaria, establish a central environmental health unit, improve sanitation, and train health personnel. The former tuberculosis control project Mali 1201 has been integrated into this project.

4401 Nursing education (1964-) R—To develop the programmes for training nurses, midwives and medicosocial workers at state-diploma and auxiliary levels, and to strengthen nursing and midwifery services.

6101 School of Medicine, Pharmacy and Dentistry, Bamako (1969-) R—To develop the school.

Mauritania

1801 Smallpox eradication (1968-) R—To complete and evaluate the eradication programme and develop epidemiological surveillance.

4001 Development of basic health services (1968-) R UNICEF—To develop basic health services and integrate maternal and child health work into them; to improve the diagnosis and treatment of malaria; and to train health personnel.

4401 Nursing education (1963-) R—To develop the programmes of the school for nurses and midwives.

Mauritius

4001 Public health services (1969-) R—To reorganize the health services, placing emphasis on the development of comprehensive and integrated peripheral services that can undertake malaria vigilance, control of other communicable diseases, a nutrition programme and health education; to improve environmental sanitation; and to train health personnel.

4301 Hospital services (1969-72) R—To develop nursing services and an in-service training programme for the Sir S. Ramgoolam National Hospital and to establish a course for departmental supervisors. Provided—a consultant for two years.

A seminar on nursing, with more than 50 participants, was held at the Hospital in September 1970. In 1971, 38 ward sisters and charge nurses from the hospitals in Mauritius attended three six-week courses in mid-line management, the objective of which was to prepare them for promotion to departmental supervisors' posts. In December 1971 three one-day workshops were held for 73 ward sisters, charge nurses and departmental supervisors for the purpose of improving coordination of nursing services and nursing education. Clinical instruction was given to 24 pupil assistant nurses assigned to the Hospital.

In addition to assisting with the abovementioned training activities, the consultant took part in study groups on the implementation of a 10-year plan for providing a comprehensive medical and health service to the community, advised on staffing and training programmes in connexion with plans for a second school of nursing at the Hospital, and advised the Ministry of Health on post descriptions and on plans for health centres.

4401 Nursing education (1970-) R—To develop a basic programme for training nurses and midwives.

5101 Maternal and child health (1971-) UNFPA UNICEF—To reorganize and strengthen the maternal and child health services in order to enable them to promote family health and welfare, including family planning activities, as an integral part of the services.

Niger

1801 Smallpox eradication (1967-) R

4001 Development of basic health services (1969-) R UNDP FT UNICEF—To expand basic health services (including special services for nomads) in accordance with the national health plan, giving particular attention to maternal and child health, school health and tuberculosis control; to plan a long-term sanitation programme, including water supplies; and to train staff.

4401 Nursing education (1966-) UNDP—To strengthen the National School of Public Health, Niamey (formerly the School of Nursing) and train multipurpose health auxiliaries.

Nigeria

1001 Epidemiological services, Federal (1968-) UNDP—To develop, at the federal level, an epidemiological service for planning, coordinating and evaluating programmes for the surveillance and control of communicable diseases; to develop a pattern for integrated health laboratory services, and to train the necessary personnel.

1003 Epidemiological services, Western State (1968-) R; 1005 North-Western State (1971-) R; 1006 North-Central, Kano and North-Eastern States (1968-) R; 1013 Mid-West State (1968-) UNDP—To develop epidemiological services for planning, coordinating and evaluating programmes for the

surveillance and control of communicable diseases, and to train the necessary staff.

1801 Smallpox eradication (1968–) R

3001 Public health engineering education (1972–) R—To strengthen the teaching of public health engineering.

3006 Health component in the Kainji Lake research project (1968–) UNDP/FAO—To provide for coordination of the health components of the project.

3008 Health component in South Chad irrigation project: Feasibility study (1972–) UNDP/FAO—To identify the health component and determine the preventive measures needed in the project area.

3303 Wastes disposal and drainage, Ibadan, phase II (1971–73) UNDP—To carry out final design and prepare tender documents for the construction of sewerage and drainage facilities in the Gbagi and Dugbe Onireke areas of Ibadan; to construct 25 comfort stations and two solid waste transfer stations; to organize a municipal waste disposal service; and to train staff.

4001 Development of basic health services, Federal (1968–) R—To coordinate activities for the development of basic health services and training of personnel and to organize antimalaria work as required.

4003 Development of basic health services, Western State (1968–) R UNDP UNICEF—To develop the basic health services, placing emphasis on building up the rural health infrastructure, carrying out environmental sanitation work and training the necessary personnel, using the experience obtained in the demonstration area.

4004 Development of basic health services, Kwara State (1971–) R; 4005 North-Western State (1971–) R—To plan health services and develop basic health services, placing emphasis on the training of health personnel in both curative and preventive medicine.

4006 Development of basic health services, North-Central State (1968–) R—To develop the basic health services, placing emphasis on building up the rural health infrastructure, carrying out environmental sanitation work and training the necessary personnel, using the experience obtained in the demonstration area.

4007 Development of basic health services, Kano State (1969–) R; 4008 North-Eastern State (1971–) R; 4009 Benue Plateau State (1971–) R; 4010 South-Eastern State (1971–) R—To plan health services and develop basic health services, placing emphasis on the training of health personnel in both curative and preventive medicine.

4013 Development of basic health services, Mid-West State (1968–) R—To develop the basic health services, placing emphasis on building up the rural health infrastructure, carrying out environmental sanitation work and training the necessary personnel, using the experience obtained in the demonstration area.

4501 Health education (1962–) UNDP—To extend health education and school health education services throughout the country and develop facilities for training personnel.

4701 School of radiography (1968–) R—To train technicians in radiography and in the maintenance and repair of X-ray and electromedical equipment.

4801 Medical rehabilitation (1968–69; 1972–) R UNICEF—To strengthen the medical rehabilitation services.

4901 Vital and health statistics, Federal (1971–) R—To develop vital and health statistics services for the whole country, plan and carry out epidemiological surveys, and train staff.

5403 Mental health, University of Ibadan (1968–) R—To develop postgraduate teaching in the Department of Psychiatry, Neurology and Neurosurgery of the University of Ibadan Medical School.

6201 Medical college, Lagos (1968–) R—To develop the teaching of anatomy at the medical school of the University of Lagos.

6206 Medical school, Zaria (1967–) R—To develop the medical school.

Rwanda

1001 Epidemiological services (1972–) R UNDP—To develop an epidemiological service for planning, coordinating and evaluating programmes for the surveillance and control of communicable diseases, strengthen the vital and health statistics services; and train the necessary personnel.

1801 Smallpox eradication (1968–) R VS—In conjunction with project Rwanda 1001 (see above), to continue and evaluate the eradication programme, and develop epidemiological surveillance.

4001 Development of basic health services (1969–) R UNICEF—To extend integrated basic health services, particularly in the rural areas, with emphasis on maternal and child care and nutrition work; and to train medical students and all categories of health personnel.

6201 Medical school, Butaré (1967–) R UNDP—To develop the medical school. (The professor of public health assigned to the project also advises on matters of public health administration and health planning.)

Senegal

1801 Smallpox eradication (1970–) R

3201 Master plan for water supply and sewerage for Dakar and surrounding areas (1966–) UNDP—To develop a phased improvement programme within a long-term plan for water supply, sewerage and storm drainage for Dakar and surrounding areas. The work also includes management, legal and finance studies for the development of a self-supporting water and sewerage authority.

4001 Development of basic health services (1968–) R UNICEF—To develop the basic health services to the level required to support mass campaigns against communicable diseases, paying particular attention to maternal and child health, the national tuberculosis control programme, treatment and control of malaria, and the training of personnel.

5501 Institute of Odontology and Stomatology, University of Dakar (1967; 1970–) R—To establish an institute of tropical odontology and stomatology at the University of Dakar and to train personnel in dental health.

Seychelles

4101 National health planning (1971–72) R—A medical officer was assigned to assist in the planning and development of national health services within the framework of the national development plan.

Sierra Leone

1001 Epidemiological services (1968-) R UNDP—To organize and develop epidemiological services for the surveillance and control of communicable diseases; to strengthen health laboratory and vital and health statistics services; and to train personnel.

1801 Smallpox eradication (1968-) R

4001 Development of basic health services (1968-) R UNICEF—To implement the national health plan, particularly as regards the development of rural health services; to strengthen specialized services and integrate them into a general service that can support mass campaigns for the control or eradication of communicable diseases; and to train personnel.

4102 Health component in development planning (1972-) UNDP/UN—To prepare a national health plan integrated into the plan for socioeconomic development.

4401 Nursing education (1961-) R UNICEF—To establish a central school of nursing and midwifery.

Swaziland

4001 Development of basic health services (1969-) UNDP—To develop basic health services, with emphasis on the training of personnel, including laboratory assistants.

Togo

1001 Epidemiological services (1968-) R UNDP UNICEF—To establish an epidemiological service that will plan, coordinate and evaluate programmes for the surveillance and control of communicable diseases; to develop health laboratory services; and to train personnel.

1801 Smallpox eradication (1968-) R

4001 Development of basic health services (1968-) R UNDP UNICEF—To develop basic health services which can provide support for mass campaigns against communicable diseases; to improve facilities for the diagnosis, treatment and control of malaria; to develop a sanitation programme; and to train personnel.

4401 Development of nursing services (1963-72) R—A nurse educator assisted in revising and developing the programmes for training nurses and midwives, in expanding nursing and midwifery services that provide practical experience for students, and in integrating public health aspects into all nursing and midwifery training programmes. She also helped with a study of the needs and resources in nursing personnel. Supplies and equipment were provided. The project was operated in liaison with projects Togo 4001 (Development of basic health services) and AFRO 6402 (Training centre for health service personnel, Lomé).

6201 School of medicine, Lomé (1971-) R—To establish and develop the medical school of the University of Bénin.

Uganda

1001 Epidemiological services (1968-) R UNDP—To set up, in the Ministry of Health, an epidemiological and health statistical service to be responsible for the surveillance and control of communicable diseases, with priority for tuberculosis and onchocerciasis; to develop national health laboratory services; and to train staff.

1801 Smallpox eradication (1968-) R VS

2801 Veterinary public health (March 1972) R—A headquarters staff member, together with two consultants, advised on the establishment of a veterinary public health programme.

3201 Master plans for water supply and sewerage for the Greater Kampala and Jinja areas (1968-72) UNDP—To undertake engineering, feasibility and related legal, managerial and financial studies, and prepare master plans and phased investment and construction programmes for water supply and sewerage for the Greater Kampala and Jinja areas. A project manager and the services of a subcontractor were provided to assist with this work, the final report on which was completed in July 1972, following review of the project activities by two WHO consultants. Fellowships and supplies and equipment were provided.

4001 Development of basic health services (1968-) R UNDP UNICEF—To strengthen and expand the basic health services so that they can support mass campaigns against communicable diseases, developing primarily rural health services with emphasis on family health, health education and environmental sanitation, and on training of personnel.

United Republic of Tanzania

1001 Epidemiological services (1969-) R—To develop epidemiological services for the surveillance and control of communicable diseases; to develop vital and health statistics services; and to train personnel.

1801 Smallpox eradication (1968-) R VS—To carry out a smallpox eradication programme combined with a BCG vaccination campaign.

2101 Schistosomiasis control (1967-) R—To assess the schistosomiasis problem, starting in the Mwanza district, and to develop a pilot control programme that can serve as a model for a future programme covering all endemic areas.

3201 Water supplies for small communities (1972-) R—To develop water supplies for small communities and train personnel in the operation and maintenance of water supply systems.

4401 Nursing education (1970-) R—To train nursing and midwifery personnel.

5601 Nutrition programme (1963-) R (FAO)—To establish a central nutrition unit, train staff, and integrate nutrition work into the health services.

6101 Centre for training medical auxiliaries, Tanga (1972-) R—To develop the centre.

6201 Medical school, Dar es Salaam (1965-) UNDP—To develop the medical school.

Upper Volta

1201 Tuberculosis control (1968-) R UNICEF—To carry out a countrywide BCG vaccination campaign; and to develop a comprehensive national tuberculosis control programme based on decentralization of initial, bacteriological, diagnosis and ambulatory treatment services and using a simplified recording and reporting system to facilitate continuous operational evaluation.

1801 Smallpox eradication (1967-) R

4001 Development of basic health services (1968-) R UNDP UNICEF—To plan, organize and develop the health services, placing emphasis on maternal and child health, environmental sanitation, and training of the staff needed for extending integrated health services to rural areas.

4401 Nursing education (1968-) R UNDP—To develop basic programmes for training nurses and midwives to state-registration level.

Zaire

1001 Epidemiological services (1968-) R VC—To develop, at central and provincial levels, epidemiological services for planning, coordinating and evaluating programmes for the surveillance and control of communicable diseases; to organize a vital and health statistics unit; and to develop health laboratory services.

1801 Smallpox eradication (1967-) R VS—To carry out a smallpox eradication programme combined with a BCG vaccination campaign; and to develop epidemiological surveillance.

3001 Environmental sanitation (1968-) R UNICEF—To plan and develop environmental health services, train personnel and organize a sanitation programme in which special attention will be given to water supplies and waste disposal.

4001 Development of basic health services (1968-) R UNDP UNICEF—To develop the basic health services, including maternal and child health activities; to study the epidemiology of malaria and organize malaria control measures; and to train health personnel.

4301 Medical care services (1968-) R—To improve the medical care services, particularly those for orthopaedics and rehabilitation, and the pharmaceutical services.

4302 Health component in Yangambi agronomic centre project (1969-) FT—To plan and provide a health service for the staff of the National Institute for Agronomic Studies and the population of the surrounding area, and to train health personnel in preventive and curative medicine.

4401 Development of nursing services (1968-) R—To train nurses and midwives at state-diploma and auxiliary levels and to set up a nursing unit at the Ministry of Public Health; to develop the nursing components of the basic health and maternal and child health services.

5601 Nutrition programme (1968-) R—To develop nutrition work within the health services, with emphasis on training in nutrition at all levels.

6101 Medical Training Institute, Kinshasa (1968-) R—To train various categories of health personnel.

6201 Medical school, National University of Zaire (1960-) R—To develop the teaching at the medical school.

Zambia

1801 Smallpox eradication (1967-) R VS—To carry out the maintenance phase of and evaluate the eradication programme; and to develop epidemiological surveillance.

4001 Development of basic health services (1969-) R UNDP—To develop health services in the rural areas to the level required for support of mass campaigns against communicable diseases; to improve the health services provided by the municipalities and industry and facilities for the diagnosis, treatment and control of malaria; to improve environmental sanitation and train health inspectors.

4101 National health planning (1969-) UNDP—To plan and coordinate a national health programme within the framework of the national development plan.

5601 National Food and Nutrition Commission (1969-) UNDP/FAO—To take measures to improve food consumption patterns in order to raise the nutritional status of the population.

6201 Medical school, Lusaka (1968-) R—To develop the medical school.

8101 Prevention of cancer (Dec. 1971–Jan. 1972) R—A consultant advised on the establishment of a radiography unit at the University Teaching Hospital, Lusaka.

AFRO

1001 Epidemiological services (1968-) R—To assist countries of the Region in surveillance and in studying local epidemiological problems and to recommend remedial measures.

1101 Consultant services in treponematoses (1965-) UNDP—To assist governments in assessing the public health importance of treponematoses and evaluating the results of former mass campaigns for control of treponematoses, especially yaws; to undertake seroepidemiological studies of endemic diseases; and to train personnel.

1301 Leprosy consultative services (1968-) UNDP—To assist governments in assessing the leprosy situation in their countries, in planning and implementing leprosy control programmes, in standardizing methods and criteria, and in evaluating the results.

1401 Cholera control (1971-) R VC—To help to develop national and regional control programmes.

1601 Cerebrospinal meningitis control (1960-) R—To assist in controlling epidemics of the disease in countries of the Region.

1602 Seminar on the Epidemiological Surveillance and Control of Cerebrospinal Meningitis, Lagos (20-24 March 1972) R—To enable medical officers in charge of communicable disease control programmes to review the present systems of epidemiological surveillance and control of cerebrospinal meningitis in the Region and to evaluate national control programmes, in order to prepare them for participating actively in the planning and management of such programmes, improving the methods at present in use, and contributing to increasing intercountry cooperation and coordination. There were 14 participants from 11 countries of West Africa that are subject to epidemics of cerebrospinal meningitis, and 14 observers. Provided—three consultants, three temporary advisers and the cost of attendance of the participants.

1801 Smallpox eradication (1965-72) R VS—To assist governments in planning and implementing programmes of mass vaccination against smallpox, in carrying out epidemiological surveys in areas where cases have been reported, and in evaluating eradication programmes in progress. Provided—two medical officers and a laboratory technician, and a technical officer from March 1971, as well as supplies and equipment.

One medical officer, assigned to West Africa, took part in epidemiological surveys and assisted in launching combined smallpox and measles vaccination campaigns receiving bilateral aid in Mali, Mauritania, Senegal, Sierra Leone, and Togo. The other, assigned to East Africa, assisted in preparing plans of operation for WHO-assisted eradication campaigns in Burundi, Kenya, Rwanda, the United Republic of Tanzania, and Zambia. He also helped to evaluate current operations and assess require-

AFRO (continued)

ments in vaccine and equipment in most of the other countries of East Africa. The laboratory technician assisted with the production of smallpox vaccine in laboratories in Kindia (Guinea) and Lagos (Nigeria) and advised vaccine-producing laboratories in Kenya and Zaire.

1901 Consultant services in virology (1969-) R—To assist governments in carrying out epidemiological surveys to provide data for the control of virus diseases.

2001 Malaria training of public health personnel (1964-) R

2002, 2003 and 2004 Consultant services in malaria, West, Central and East Africa (1967-) R—To provide for the assessment of the malaria situation in the countries of the Region, and to assist in the planning, implementation and evaluation of antimalaria activities feasible under local conditions.

2201 Consultant services in onchocerciasis (1966-) R UNDP—To assist governments in assessing the problem of onchocerciasis and in drawing up control programmes.

2202 Onchocerciasis control, Volta River basin (1971-) UNDP—To work out a detailed plan for the control of onchocerciasis in the Volta River basin and estimate the cost of the project.

2301 Consultant services in trypanosomiasis (1969-70; 1972-) R—To study the trypanosomiasis situation in affected countries, locate foci of the disease and determine their importance; to study vector ecology and methods of controlling the disease, and submit recommendations to assist governments in planning control programmes.

2901 Epidemiological surveillance centre, Nairobi (1960-) R;
2902 Abidjan (1970-) R—To participate in the collection, analysis and evaluation of epidemiological data as a basis for planning, implementing and coordinating epidemiological surveillance and control of communicable diseases.

3005 Training centres for sanitary technicians (1972-) R—To develop facilities for the training of sanitary technicians capable of planning, developing and implementing sanitation programmes in the Region.

3202 Consultant services in water supply and sewerage (1969-) R—To assist governments in carrying out studies on water supply and sewerage programmes and to provide for the planning, organization, implementation and assessment of such programmes in the Region.

4104 Pilot studies on the needs in health personnel (1970; 1972-) R—To undertake pilot studies on the existing situation and on the additional needs in health personnel specially oriented for service under local conditions.

4105 Consultant services for socioeconomic development projects (1970-) R—To study the health components and to assess the public health implications of socioeconomic development schemes in preparation and under implementation in the countries of the Region.

4106 Symposium on the Methodology of Health Team Manpower Planning, Brazzaville (29 May-3 June 1972) R—To work out a methodology of constituting health teams in the African Region. There were 14 participants from 11 countries of the Region. Provided—a consultant, five temporary advisers, the cost of attendance of the participants and the services of staff members.

4107 Consultant services in health legislation (1971-) R—To meet requests from governments for assistance in health legislation.

4202 Health laboratory consultant services (1971-) R—To assist governments in developing and strengthening health laboratory services, including blood banks.

4301 Centre for training technicians in the repair and maintenance of medical equipment (1970-) R—To train technicians for the installation, maintenance and repair of X-ray apparatus and other electromedical equipment.

4302 Consultant services in hospital administration (1972-) R—To assist in improving hospital administration in the countries of the Region.

4401 Centre for postbasic nursing education, Ibadan (1962-73) R UNICEF—To develop the Department of Nursing at the University of Ibadan as a regional centre for preparing nurses of a high educational level to provide professional guidance in the improvement and extension of nursing services and education.

4402 Centre for postbasic nursing education, West Africa (1967-) R; **4404 East-central Africa (1972-) R**—To assist in establishing centres which will provide facilities for postbasic education in all fields of nursing for French-speaking nurses and midwives from African countries.

4501 Consultant services in health education (1971-) R UNFPA—To assist in evaluating and strengthening the health education services in the countries of the Region.

4503 Centres for training in health education (1972-) R—To help to provide facilities for the development of undergraduate and postgraduate training in health education in medical training institutions.

4801 Medical rehabilitation (Feb.-June 1972) R—Three consultants visited Guinea, Liberia, Nigeria, Senegal, Uganda and Zaire in order to study the situation with regard to medical rehabilitation services, assist the Governments in planning and organizing such services, and prepare educational objectives for a training programme for medical and other staff.

4901 Training in health statistics (1965-) R—To assist with courses for training middle grade and clerical personnel in vital and health statistics at the Statistics Training Institute in Yaoundé, the East African Statistical Training Centre in Dar es Salaam and the School of Statistics in Abidjan.

4902 Consultant services in vital and health statistics (1970-) R—To assist governments in planning the development of vital and health statistical services, in establishing working methods for epidemiological research and in training health statistics personnel.

5102 Maternal and child health (1972-) UNFPA—To assist in training nurses and midwives in matters concerning human reproduction, with a view to the introduction of family planning activities into maternal and child health care.

5201 Consultant services in occupational health (1971-) R—To assist countries of the Region in planning low-cost comprehensive health services for workers and their families as part of the general public health services, and in the training of personnel.

5601 Joint FAO/WHO/OAU Regional Food and Nutrition Commission for Africa (1964-) R—To facilitate contacts between specialists interested in nutrition problems in Africa and prepare and distribute material on all nutrition work in Africa.

5602 Consultant services in nutrition (1965-) R—To assist countries of the Region in developing nutrition activities within the framework of their health administrations, and to promote training of health workers and nutrition education programmes.

5603 Seminar on Integration of Nutrition Activities in the Framework of Basic Health Services, Brazzaville (19-24 June 1972) R—To promote the integration of nutrition work into the basic health services in countries of the Region. Provided—a consultant and the cost of attendance of the participants, who came from 21 countries of the Region.

6201 Workshops on educational methodology (1969-) R—To enable teachers of health sciences to study teaching methods and acquaint themselves with new educational techniques.

6203 Staff exchanges between medical schools of the African Region (1968-) R—To provide the opportunity for interchange of views and experience amongst teachers in medical schools in the Region.

6204 Faculty of Medicine, Makerere University, Kampala, Uganda (1968-) R—To strengthen the teaching at the Faculty of Medicine.

6205 Schools of medicine and other teaching institutions (1968-) R—To assist in providing health teaching institutions with educational material, textbooks, and laboratory equipment.

6206 Teacher-training centres (1971-) R—To train teachers of health staff training centres of the Region in modern educational techniques.

6207 Meeting of teachers of health sciences, Brazzaville (16-20 Oct. 1972) R—Teachers of health sciences from 14 countries of the Region took part in the meeting, the aim of which was to enable them to construct an integrated programme of undergraduate medical studies, taking into account institutional objectives; and describe the methods and successive steps necessary for the implementation of an integrated curriculum. Provided—two consultants and the cost of attendance of the participants.

6401 Training centre for health service personnel (English language), Lagos (1961-) R; 6402 (French language), Lomé (1962-) R—To organize special courses for various categories of public health workers required for the development of basic health services, particularly in the countries of the Region, and to provide training in malariology and antimalaria measures and techniques.

6404 Consultant group on the teaching of public health (1971-) R—To evaluate the present status of public health teaching in Africa and formulate recommendations for its improvement.

6405 Departments, institutes and schools of public health (1971-) R—To assist in establishing and developing departments, institutes and schools of public health which will train the staff needed for the extension of health services.

7401 Consultant services in pharmacology and toxicology (1969-) R—To study the scope of activities in quality control of pharmaceuticals and advise on the development of suitable control laboratory facilities on a regional basis.

REGION OF THE AMERICAS

Argentina

0100 Communicable disease control (1969-70; 1972-) R—To develop the epidemiological surveillance systems, reduce the prevalence of leprosy, tuberculosis, venereal diseases and Chagas' disease, conduct immunological studies for determining the level of protection against diseases for which there are effective vaccines, and increase the vaccination coverage of the population.

0200 Malaria eradication programme (1951-) PR

0300 Smallpox eradication (1967-73) R—To eradicate smallpox through vaccination of 90% of the population in five years, and to organize epidemiological surveillance services.

0700 Pan American Zoonoses Centre (1972-) UNDP—To strengthen the programme of the Centre.¹

0701 Bovine rabies control (1965-) PG: Government of Argentina—To evaluate the vaccines used for the control of bovine rabies and conduct studies on new vaccines.

2100 Engineering and environmental sciences (1967-76) PR—To strengthen the organization of environmental sanitation services and programmes at the federal and provincial levels and to train professional and technical personnel.

2200 Water supplies (1960-75) R—To construct and improve the administration of water and sewerage services and to train personnel.

3100 Health services (1966-) R PR—To improve the health services. Under this project assistance is provided to the Ministry of Welfare and Public Health in health planning, the supervision and evaluation of programmes, training and research.

3500 Health statistics (1960-66; 1967-71) PR—To improve and modernize the vital and health statistics systems and train statistical personnel. Provided—short-term consultants, advisory services, including those of staff of Zone VI project AMRO 3506 and interzone project AMRO 6708, eight fellowships (three of them in 1971), and supplies and equipment.

In the first stage of this project a consultant assisted in the introduction of new forms for certification of births, marriages and deaths, including fetal deaths, in Buenos Aires Province, which served as a demonstration and training area for the other provinces. In the second stage, with the adoption and implementation of the national health statistics plan by the Health Statistics Department of the Under-Secretariat for Public Health, permanent systems for production of these vital statistics and of data on morbidity in hospital patients, notifiable diseases, hospital bed utilization, and movement in outpatient clinics, were set up in official establishments throughout the country.

In 1971 the provincial statistical programmes were consolidated and timetables for production of data established, publications increased, technical and auxiliary staff trained, and an evaluation made of the activities during that year. A study of coding of hospital data, based on samples from all provinces, was begun.

¹ For work done during the first phase of the project (1967-71), see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 273.

3504 Centre for utilization of computers in health programmes (1968-) UNDP—To develop the medical computing centre at the Faculty of Medical Sciences, University of Buenos Aires, which provides computer services in connexion with health planning and programming and carries out training and research.

4100 Teaching in maternal and child health and family planning (1972-73) PK—To develop human resources for maternal and child health and family welfare work.

4202 Applied nutrition (1972-) UNDP—To determine the nutritional status of the population and develop an applied nutrition programme in Salta Province.

4203 Nutrition studies (1971-) UNDP—To determine the characteristics of malnutrition in the population of the north-east of Argentina and study the relationship between malnutrition and malabsorption.

4300 Mental health (1966-74) PR—To implement a national programme in social psychiatry, develop community mental health work, and train personnel.

4400 Dental health (1972-75) PR—To install a demineralization plant for testing and demonstrating to students of the Institute of Sanitary Engineering the extraction of excess fluorine and arsenic from water.

4500 Radiation protection (1967-74) PR—To develop a national radiation protection programme, including a census of all radiological equipment and certification of its safe functioning and provision of a radiation monitoring service; and to train personnel.

4803 Latin American Centre for Medical Administration (1967-) R PR PH PG: Government of Argentina; Kellogg Foundation—To develop the Centre, which studies national problems in the provision and administration of medical care services, trains personnel for technical and administrative posts in hospitals and other health institutions, and serves as a Latin American centre for research in the use and financing of medical services and the development of human resources.

6100 School of public health (1958-75) R—To strengthen the teaching programme of the School of Public Health of the University of Buenos Aires.

6200 Medical education (1958-74) R PR—To improve the teaching at the schools of medicine.

6201 Health manpower study (1968-74) R—To make a study of health manpower requirements and the means of meeting them; and to collect data to enable the medical education and health personnel training programmes to be reoriented.

6202 Centre for Biostatistics and Demography (1968-71) R PR—To disseminate biostatistical and demographic information and promote its application to medicine, through the Centre set up in 1968 in the Faculty of Medical Sciences of the University of Buenos Aires. Provided—a consultant, the advisory services of a statistician from Zone VI project AMRO 3506, two fellowships, and supplies and equipment.

Between 1969 and 1971 several hundred medical officers, teachers and research workers attended courses and seminars in biostatistics and demography organized by the Centre at the Faculty or in other medical and veterinary schools, and in collaboration with the School of Public Health and other agencies. The Centre also collaborated with the Association of Medical Schools in the establishment of national standards for the teaching of statistics, the training of teaching staff, and the creation of similar centres in other schools.

Staff of the Centre participated in or gave advice on over a hundred research projects, carried out demographic studies on infant and perinatal mortality, fertility and migration, and assisted in the national health survey (1970) and the national study on health and medical education. In addition, research on statistical methods for medical diagnosis was conducted with the cooperation of the medical computing centre.

6203 Faculty training programme (1971) R—A consultant gave advice on teaching methods and planning and curriculum design in connexion with a plan drafted by the organizing committee of the Health Sciences Institute at the Catholic University of Córdoba for the establishment of a health sciences centre. It was decided as from 1972 to include the activities in project Argentina 6200 (Medical education).

6400 Sanitary engineering education (1960–75) PR—To improve the teaching at undergraduate and postgraduate levels at the Institute of Sanitary Engineering, University of Buenos Aires, and at other schools of engineering.

6700 Training of statistical personnel (1965–) PR—To train statistical personnel for work in local and regional health statistics offices, and in departments of statistics and of medical records in hospitals and health centres.

Barbados

0700 Veterinary public health (1972–) PR—To establish a national zoonoses control programme.

2100 Engineering and environmental sciences (1970–74) PR—To plan and implement environmental health programmes.

2201 Water supply and sewerage services administration (1971–73) PR PW—To improve the administration and management of water supply and sewerage services.

2300 Aedes aegypti eradication (1968–73) PR

3100 Health services (1968–) PR—To improve, expand and integrate the curative and preventive health services and train health personnel.

4801 Hospital administration (1965–) UNDP PR—To develop the Queen Elizabeth Hospital as the principal medical centre of the country and coordinate its activities with those of other hospitals.

6600 Dental education (1972–) R—To train staff for a comprehensive programme of dental care for schoolchildren and pregnant women and for indigent persons.

Bolivia

0100 Epidemiology (1968–) UNDP PR—To determine the prevalence and distribution of the main communicable diseases and to study and apply measures for their control.

0200 Malaria eradication programme (1965–) PR UNICEF

0201 Mass drug treatment for malaria eradication (1970–71) PR—To complete a trial on the feasibility of radical cure of *Plasmodium vivax* infections as a means of eradicating malaria from foci in southern Bolivia. Provided—advisory services of staff of Bolivia 0200 (Malaria eradication programme), and a grant.

The trial, which began under project AMRO 0220, covered 165 localities and 18 000 inhabitants in the Pilcomayo River valley, Department of Tarija. Four treatment cycles were performed using a combination of chloroquine, primaquine, and pyrimethamine. Two sampling surveys were carried out, one at the start of the trial and one 12 months later. The planned activities in the six control areas were hindered by administrative difficulties, so that there was no basis for comparison of results. The epidemiological situation in the trial area as a whole improved slightly in spite of population movement, ranging from 9 to 19% between treatment cycles, while that in the rest of the country deteriorated.

0300 Smallpox eradication (1962–74) R—To carry out a programme of combined smallpox and BCG vaccination which started in 1969 and which is aimed at covering 2 170 000 people in five years.

0400 Tuberculosis control (1963–75) PR—To improve the efficiency of the tuberculosis control programme and incorporate tuberculosis control work into the regular work of the local health services.

0701 Zoonoses control (1971–75) R—To implement demonstration programmes for the control of rabies and other zoonoses of public health importance, with a view to developing work methods adapted to the country's requirements and training personnel.

0901 Typhus (1968–) PR—To carry out a pilot control programme.

2100 Engineering and environmental sciences (1969–75) PR—To improve the environmental health and sanitation levels of the urban and rural population.

2200 Water supplies (1960–70; 1972–) PR—To provide water supplies and sewerage services to urban and rural communities.

2201 Water supply and sewerage services administration (1971–) R PW—To strengthen the administration of the National Water and Sewerage Corporation.

2202 Water supply and sewerage services administration, Cochabamba (1971–) PW—To strengthen the Municipal Water, Sewerage and Drainage Service and improve its administration.

2203 Water supply and sewerage services administration, Potosí (1972–74) PW (Inter-American Development Bank) (Departmental Committee of Development and Public Works, Potosí) (Potosí Water Authority)—To design new systems for and construct additions to the Potosí water and sewerage services and to develop the administrative structure of the services.

3100 Health services (1955–75) R UNDP PR PK—To improve and extend the health services in urban and rural areas and train health personnel.

3104 Health services, Cochabamba and Tarija (1966–74) UNDP—To develop the health services and improve basic sanitation services in Cochabamba, Tarija and some other departments.

Bolivia (continued)

3400 Health education in family planning (1972-) UNFPA—To plan the educational component in health aspects of family planning.

3500 Health statistics (1968-) UNDP—To develop a national statistics system to provide the data required for planning and programming in the health sector.

4200 Nutrition (1971-) PR—To develop nutrition programmes and programmes for controlling endemic goitre and cretinism in the population of isolated areas.

4600 Occupational health (1971-) UNDP—To expand the industrial hygiene programme in order to reduce mortality, morbidity and economic losses due to occupational diseases and accidents in the mining and other industries.

4800 Medical care services (1972-) R—To coordinate the work of the hospitals and other health facilities and train personnel in hospital administration.

6200 Medical education (1968-) R—To revise the programme of the three medical schools and incorporate concepts of social and preventive medicine into the curricula.

6400 Sanitary engineering education (1964-74) PR—To improve the university training of sanitary engineers and train practising engineers and auxiliary staff in environmental sanitation subjects.

6500 Veterinary medical education (1967-) R—To improve the teaching of veterinary medicine, and particularly the preventive and social aspects, at the University of Santa Cruz de la Sierra.

6600 Dental education (1968-) R—To strengthen the teaching programmes of the faculties of dentistry of La Paz, Tarija and Sucre and incorporate the teaching of social and preventive dentistry into the curricula.

Brazil

0100 Epidemiology (1969-) R PR—To develop and coordinate programmes for the control of communicable diseases, organize epidemiological services and surveillance systems and train personnel in epidemiology.

0200 Malaria eradication programme (1958-) R PR

0300 Smallpox eradication (1956-) R—To maintain the level of immunization against smallpox in the population and carry out epidemiological surveillance work.

0400 Tuberculosis control (1966-74) R—To determine the tuberculosis control methods best adapted to the conditions in each region, expand the facilities for bacteriological diagnosis and extend BCG vaccination.

0700 Veterinary public health (1969-75) R PG: Government of Brazil—To develop veterinary public health services and education, particularly as regards control of zoonoses and food protection.

0900 Studies on clinical features of leishmaniasis (1972-) VD—To carry out scientific studies on the clinical aspects of leishmaniasis.

0901 Plague research (1965-75) R—To plan and carry out a research programme that could serve as a basis for a reorientation of the control of plague in the country.

1000 Schistosomiasis (1971-74) R PR—To determine the effectiveness of chemotherapy in preventing the development of severe forms of schistosomiasis in cases of continual re-exposure to infection.¹

2100 Engineering and environmental sciences (1952-74) PR—To carry out studies on environmental problems, implement environmental sanitation programmes, and train personnel.

2103 Environmental pollution control, São Paulo State (1971-) UNDP—To develop an environmental pollution control programme (covering air, water and soil pollution) for the State.

2200 Water supplies (1962-) R—To intensify the development of water and sewerage services in urban and rural areas.

2201 Water supplies, São Paulo (1969-) PW (Inter-American Development Bank)—To strengthen the management of the São Paulo water and sewerage authority.

2202 Water supplies, Belo Horizonte (1970-) PR PW (Municipal Water and Sewerage Department, Belo Horizonte)—To improve the organization and administration of the Belo Horizonte water and sewerage department.

2203 Water supply system administration, Espírito Santo (1972-74) PW (Espírito Santo Co.)—To reorganize the state water supply and sewerage agency (Espírito Santo Co.).

2204 Water supply and sewerage services administration, Minas Gerais (1972-74) PW (Minas Gerais Water and Sewerage Agency)—To develop new criteria, procedures and manuals for the Water and Sewerage Agency and provide in-service training in their use and/or implementation.

3100 General health services (1971-) R PR—To develop the health infrastructures for the provision of integrated medical services and the preservation and improvement of the environment.

3101 Health services in states and territories (1958-74) R PR—To reorganize the central agencies of the ministries of health of the nine north-eastern states, coordinate their health institutions, organize a system of regionalization, establish health planning processes in the ministries of health, develop a uniform statistical system, incorporate nutrition work into the health plans, improve the structure of the institutions in charge of water and sewage disposal services, and train health personnel.

3108 Health services in rural areas (1969-) R—To improve the health services in rural areas as part of a general rural development programme.

3109 Health services, Amazon basin (1971-) PR—To implement the health plan forming part of the integration project for the Amazon region.

3110 Health services, south-eastern states (1968-74) R PR—To improve and expand the health services in the states of Paraná, Rio Grande do Sul and Santa Catarina, as part of the process of socioeconomic development.

3302 Yellow fever laboratory (1950-75) PR—To support the continent-wide campaign against yellow fever by providing laboratory diagnostic services and supplying yellow fever vaccine.

¹ For work carried out between 1966 and 1970, see *Off. Rec. Wild Hlth Org.*, 1972, No. 197, p. 276.

3400 Health education (1968-) R PR—To reorient health education activities in the technical health education units and in teaching institutions.

3500 Health statistics (1963-) R—To improve health statistics and their use in the planning, implementation and evaluation of health programmes, and to train statistical staff.

3701 Planning for health services, north-eastern states (1958-) UNDP—To strengthen health planning in the nine north-eastern states.

4101 Maternal and child health (1971-75) R—To reduce maternal and infant mortality and morbidity through a co-ordinated programme of health assistance during the perinatal period.

4203 Institute of Nutrition, Recife (1964-74) PR—To strengthen the structure and activities of the Institute of Nutrition of the Federal University of Pernambuco (formerly the University of Recife), to enable it to contribute more effectively to the solution of regional nutrition problems.

4300 Mental health (1968-74) PR—To reorganize mental health services, establish national and state programmes for the improvement of mental health care, and train personnel.

4602 Toxicology of pesticides (1968-) UNDP/FAO—To expand the toxicological studies of pesticides at the Biological Institute, São Paulo.

4800 Medical care services (1966-) R PR—To plan and organize medical care services, integrating as far as possible the services provided by the general health programmes, social security agencies and social welfare institutions, and to train personnel.

5101 Cancer control (1971-75) PR—To establish cancer control programmes and train the necessary staff.

6102 Development of human resources (1971-) R PR—To increase the number and improve the quality of health personnel, collect data on the supply of and demand for health personnel, and formulate and implement a plan for the development of human resources for health services.

6200 Medical education, Guanabara (1965-74) R—To strengthen the medical education programme and improve the administration of the School of Medical Sciences of the Guanabara State University.

6302 Training of nursing auxiliaries (1963-) PR—To increase the number and improve the quality of the training of nursing auxiliaries.

6400 Institute of Sanitary Engineering (1972-) UNDP—To develop a programme for the control of water, air and soil pollution in the Rio de Janeiro metropolitan area.

British Honduras

0200 Malaria eradication programme (1956-) PR UNICEF

2100 Engineering and environmental sciences (1971-75) PR—To develop a national programme of environmental sanitation, including the provision of water supply and sewerage services to urban and rural communities.

2300 Aedes aegypti eradication (1972-) PR

3100 Health services (1962-75) R PR PK UNICEF—To improve and extend the health and sanitation services, and to train personnel.

6400 Sanitary engineering education (1966-74) PR—To develop short courses in sanitary engineering and environmental sanitation subjects.

Chile

0300 Smallpox eradication (1967-71) R—To vaccinate a large proportion of the population against smallpox in order to prevent its reappearance; to organize an epidemiological surveillance service; and to produce freeze-dried vaccine in sufficient quantity for the country's requirements. Provided—consultants and advisory services, reference laboratory services for vaccine testing at Connaught Laboratories, Toronto, Canada, two fellowships for the study of production procedures, and supplies and equipment.

In 1967 a vaccination campaign was instituted through the general health services, using locally produced glycerinated and freeze-dried vaccines; the population of the Department of Arica, which borders on Bolivia and Peru, received special attention. A surveillance service was established and laboratory testing facilities provided. In 1970 it was decided to revise the vaccine production equipment, and in 1971, with the technical advice of the Organization, which also made arrangements for testing the potency and stability of vaccines, a freeze-drying plant was installed at the Bacteriological Institute of Chile. By the end of the year it had produced more than 500 000 doses of vaccine.

0400 Tuberculosis control (1964-74) PR—To extend the national tuberculosis control programme as part of the general health services.

0700 Veterinary public health (1971-75) PR—To eradicate canine rabies, implement a programme for anthrax control in Ñuble Province, and control other zoonoses.

2100 Engineering and environmental sciences (1968-74) R—To plan and implement environmental sanitation programmes, including programmes for control of environmental pollution, integrate the programmes into the health plans, and train personnel.

2200 Water supplies (1970-) PR—To plan and implement water supply and sewerage programmes for urban and rural areas.

3100 Health services (1961-) R UNDP PR PG: Organization of American States—To strengthen the administration of the national health services.

3105 Health manpower studies (1968-74) PR—To carry out studies on health manpower requirements and utilization.

3301 Bacteriological Institute (1972-) UNDP—To reorganize the Institute.

4100 Maternal and child care (1967-) PR—To develop a programme of training and research on biological and social aspects of human reproduction and child growth and development; and to improve maternal and child health care.

Chile (continued)

4101 Maternal and child health and family welfare service (1972-76) PR—To carry out an expanded programme of maternal and child health care and family planning, including organization of centres for diagnosis, treatment, and training of the necessary personnel.

4103 Clinical and social paediatrics courses (1967-74) R PR—To provide intensive training in clinical paediatrics and in the administration of health services for infants and children.

4200 Nutrition (1968; 1971-74) PR—To develop and implement plans for initiating or strengthening nutrition programmes and to incorporate nutrition work into local health services.

4201 Training in nutrition and human growth and development (1968-69; 1971-74) PR (Cornell University, USA)—To train Latin American research workers in nutrition and human growth and development.

4300 Mental health (1965-) UNDP PR—To develop community mental health techniques in a health district of Santiago, with a view to their subsequent application in the rest of the country, and to conduct epidemiological studies on mental disorders.

4601 Institute of Occupational Health and Air Pollution Research (1961-) R—To contribute to the solution of problems of industrial hygiene and occupational health. The Institute trains personnel, carries out research, advises the Government and private organizations on subjects within its competence, and assists in matters relating to labour legislation.

4800 Hospital maintenance (1966-74) PR—To carry out a study of maintenance of hospital buildings, installations and equipment with a view to establishing a system for hospital maintenance operations.

4901 Teaching and research in demography (1972-74) PR—To carry out research on fertility patterns and population changes, and on demography and its relationship to health; and to improve statistical information and teaching in these fields.

5000 Rehabilitation (1960-) UNDP—To implement a rehabilitation programme directed particularly to the training of specialists in the rehabilitation of the deaf.

5101 Cancer (1965-75) PR—To extend a programme, begun in Santiago, for detection of cancer of the cervix uteri, and to train staff for the purpose.

6100 School of public health (1958-74) R—To strengthen the teaching at the Department of Public Health and Social Medicine (formerly the School of Public Health) of the University of Chile and expand its facilities for the benefit of students from other countries.

6200 Medical education (1962-) PR—To expand and strengthen medical education, and to develop a programme of medical internships in rural hospitals for students of the medical professions.

6201 Training in the medical use of radioisotopes (1962-) PR—To provide training in the medical use of radioisotopes and in radiation protection.

6300 Nursing education (1971-75) PR—To organize programmes of specialization in nursing.

6400 Sanitary engineering education (1965-) R—To strengthen and extend teaching and research in sanitary engineering.

6500 Veterinary medical education (1966-) PR—To improve the teaching programme at the School of Livestock Sciences and Veterinary Medicine of the University of Chile, particularly as regards the preventive medicine and public health aspects.

6600 Dental education (1965-) R—To implement a programme for the teaching of preventive and social dentistry at the school of dentistry of the University of Concepción.

Colombia

0200 Malaria eradication programme (1958-) PR UNICEF

0300 Smallpox eradication (1967-) R—To carry out a campaign aimed at vaccinating at least 80% of the population against smallpox and to organize epidemiological surveillance.

0500 Leprosy control (1971-72) PR—Grants were provided in support of research work on experimental transmission of leprosy to animals, determination of the presence of concomitant mycobacteria in hamsters, and transformation of mycobacteria.

0700 Veterinary public health (1971-74) R—To implement programmes for the control of the main zoonoses, and train the necessary staff.

0701 Rabies control (1971-) R—To implement a pilot project for the control of rabies in the Cauca River valley, in preparation for a national control programme.

2100 Engineering and environmental sciences (1970-) R—To improve the national, regional and local environmental sanitation programmes, including those covering provision of water supply and sewerage systems and water pollution control.

2102 Water resource studies (1969-73) PW—To conserve and make best possible use of the water resources of the Bogotá savanna and the Ubaté and Chiquinquirá valleys.

2201 Water supply and sewerage services administration, Palmira (1971-) PW—To improve the administration and management of the city's water and sewerage authority.

2202 Water supply and sewerage services administration (1971-74) PW—To strengthen and improve the organization and administration of the National Institute of Municipal Development.

2300 Aedes aegypti eradication (1951-) PR

2301 Investigation and control of dengue fever (1972-) PG: US Army Medical Research and Development Command—To intensify field and laboratory studies on dengue fever and similar virus diseases; to increase the services for surveillance of yellow fever; and to strengthen and modernize the national virus laboratory.

2500 Air pollution (1971-74) R—To determine the air pollution problem in the main cities, initiate programmes of prevention and control and establish the services required for their development.

3100 Health services (1951-74) R UNDP PR UNICEF—To extend the coverage of the health services and improve their structure and operation.

3301 National Institute of Health (Carlos Finlay) (1950-) PR—To strengthen the work of the public health laboratory and the production of biologicals at the National Institute of Health and improve its diagnostic and reference sections and its administrative organization.

4100 Social services (1970-) PR UNICEF (UN Social Development Programme) (FAO)—To carry out intersectoral programmes aimed at providing comprehensive care to children and young adults within the context of protection of the family.

4101 Clinical and social paediatrics (1964-) R UNICEF—To improve the preparation of paediatricians, through the provision of three-month postgraduate courses, in order to prepare them better for dealing with problems that affect the health of children and for improving the administration of health services for children.

4200 Nutrition (1964-) PR—To train teachers for the schools of nutrition and dietetics.

4500 Radiation protection (1967-70; 1972-74) R—To establish a national radiation protection programme.

4900 Health and population dynamics (1968-74) PK—To extend maternal and child health care and family welfare services to the rural areas, improve their administration and the reporting system; and train rural health personnel.

6100 School of public health (1959-74) R—To strengthen the School of Public Health of the University of Antioquia.

6201 Medical education (1965-) PR—To strengthen medical education and provide continuing education to practising physicians, especially those in rural areas.

6203 Centre for the teaching of pathology (1967-) PR—To strengthen the centre for the teaching of pathology set up in collaboration with the departments of pathology of the National University, Bogotá, the University of Valle and the University of Antioquia.

6204 Experimental study of health services (1967-71) PG: USAID—To perform an operational study, based on the results of the survey of resources in health manpower and medical education carried out between 1964 and 1967, in order to determine the training and utilization of auxiliary health personnel. Provided—10 short-term consultants, advisory services of staff members, local costs, funds for publications, and supplies and equipment.

The areas to be covered by the study were selected, a model for experimental activities was designed and manuals relating to the model were prepared according to standards established in the light of the survey completed in 1967. In investigating the activities of health personnel in the experimental areas, work done by physicians was in particular compared with that of the auxiliary personnel with a view to the possible delegation of certain professional functions. Various activities were carried out according to the model, the experimental data collected and analysed, and a comparison made of the findings in the experimental areas with the activities in control areas. The study was completed towards the end of 1971, and plans were made for publication of the final report.

6300 Nursing education (1968-75) PR PK—To establish a centre for education and research in maternal and child health nursing to serve Colombia and other countries in Latin America.

6400 Sanitary engineering education (1964-) PR—To improve the teaching of sanitary engineering in the universities and provide short intensive courses in sanitary engineering subjects.

6500 Veterinary medical education (1969-) PR—To improve the teaching of veterinary public health and related subjects in the schools of veterinary medicine and the veterinary medicine

programme of the School of Public Health, University of Antioquia.

6600 Dental education (1961-) PR—To develop the dental education programmes at the National University, Bogotá, and the Universities of Valle, Antioquia and Javeriana.

Costa Rica

0200 Malaria eradication programme (1956-) R UNICEF

0400 Tuberculosis control (1971-74) PR—To incorporate tuberculosis control work into the general health services, and train personnel of the services in control methods and techniques.

2100 Engineering and environmental sciences (1969-75) PR—To plan and implement environmental sanitation programmes, including programmes for water and air pollution control, solid waste disposal, industrial hygiene, vector control and food hygiene; and to train auxiliary sanitation personnel.

2200 Water supplies (1960-75) PR PW (Inter-American Development Bank)—To improve the structure and administration of the national water and sewerage service; and to plan and carry out programmes for the construction and extension of water supply and sewerage systems in urban and rural areas.

2300 Aedes aegypti eradication (1971-74) PR

3100 Health services (1959-74) R PR—To prepare and implement a national health plan as part of the national economic and social development plan; and to expand the health services and improve their organization and administration.

3300 Laboratory services (1967-74) PR—To improve and expand the health laboratory services at the central, regional and local levels.

4200 Nutrition (1960-72) R—To improve the nutritional level of the population by means of nutrition education, supplementary feeding, provision of agricultural activities in schools and training of professional and intermediate-level staff.

4500 Radiation protection (1972-74) PR—To develop a national radiation protection programme in the Ministry of Public Health in cooperation with the Costa Rican Atomic Energy Commission.

4800 Medical care services (1967-) R—To improve the organization and administration of the medical care services and to train personnel.

4900 Maternity-centred family planning programme (1971-74) PK—To provide family planning services through the maternity hospitals, to complement those provided through the Ministry of Public Health's Population Bureau and the social security system.

6300 Advanced nursing education (1959-) PR—To improve the education programmes in nursing and obstetrics and incorporate them into the country's higher educational system.

6400 Sanitary engineering education (1965-74) PR—To strengthen the teaching of sanitary engineering at the School of Engineering of the University of Costa Rica and provide short intensive courses on sanitary engineering subjects for personnel working on environmental health programmes.

6700 Biostatistics education (1966-) R—To train medical records librarians for hospitals in Costa Rica and other Latin American countries.

Cuba

0100 Communicable disease control (1967-75) PR UNICEF—To carry out programmes of vaccination against certain communicable diseases and integrate the programmes into the work of the general health services.

0400 Tuberculosis control (1969-74) PR—To extend the tuberculosis control programme to the whole country and integrate it into the general health services; and to train personnel in tuberculosis control methods and techniques.

0600 Venereal diseases (1969-) R—To improve the epidemiological and laboratory aspects of the venereal disease control programme.

0700 Zoonoses control (1969-) PR—To plan and implement, within the veterinary public health services, programmes for the control of zoonoses, particularly rabies, brucellosis and bovine tuberculosis.

2100 Engineering and environmental sciences (1969-) R—To strengthen environmental sanitation programmes, particularly those concerned with the collection, transport and disposal of solid wastes, with the use of pesticides, and with studies on vector control.

2300 Aedes aegypti eradication (1953-74) R PR

3100 Health services (1959-) R UNDP PR—To improve the organization and operation of the general health services and the administration of government medical care institutions, and to develop special services at the national level.

3300 Laboratory services (1968-) R—To strengthen the National Institute of Hygiene, Epidemiology and Microbiology.

3301 Modernization of laboratory services (1971-76) UNDP—To expand the facilities of the new Finlay Institute for the production of biologicals for the prevention, diagnosis and treatment of communicable diseases, improve the quality of such products, and train personnel.

4100 Maternal and child care (1972-) R—To develop a maternal and child care programme, with special emphasis on the control of communicable diseases, prenatal and postnatal care, and family planning.

4200 Nutrition (1965-) UNDP—To implement a training programme for nutrition personnel, and a programme of nutrition education, and to study nutrition problems.

4600 Occupational health (1969-) PR—To strengthen the national programmes of industrial hygiene and safety and of air pollution control.

6200 Medical education (1965-74) R PR—To strengthen and develop medical education, particularly as regards the preventive and social aspects.

6400 Sanitary engineering education (1966-) R—To strengthen the teaching of sanitary engineering at the University of Havana and improve the preparation of professional and auxiliary personnel engaged in the national environmental sanitation programmes.

Dominican Republic

0200 Malaria eradication programme (1952-) PR UNICEF

0400 Tuberculosis control (1963-74) UNDP PR—To extend the national tuberculosis control programme and integrate it into the general health services; and to train personnel in modern control methods.

2100 Engineering and environmental sciences (1971-74) R PG: Organization of American States—To implement a programme for the installation of latrines, mainly in the communities covered by the rural water supply plan of the National Institute of Water Supply and Sewage Disposal.

2200 Water supplies (1962-74) PR—To provide water supply facilities to 62% of the urban and 25% of the rural population and sewerage facilities to 17% of the urban population; to integrate into the National Institute of Water Supply and Sewage Disposal 45% of the systems operated by the municipalities; and to strengthen the administration of the Institute.

3100 Health services (1953-) R UNDP PR PG: Organization of American States UNICEF—To develop the health services and improve their organization and functioning.

3300 Laboratory services (1968-71) PR—To organize public health and clinical diagnostic laboratory services in hospitals and regional laboratories, to establish and standardize procedures, and to train personnel. Provided—a medical officer and advisory services of staff of project Dominican Republic 3100 (Health services).

At the outset of the project, when an inventory of manpower resources was carried out, there were a total of some 260 technicians working in the national health laboratory, the three regional laboratories and 63 local hospital laboratories. In addition to the reorganization and strengthening of the national health laboratory for service as a central public health laboratory, activities were directed at the integration of regional and local services in a national public health and diagnostic laboratory system; the scope of the nutrition laboratory was enlarged; the rabies diagnosis service was provided with modern equipment for immunofluorescent tests; and a serum processing plant was put into operation. Twenty-five auxiliaries from laboratories and blood banks attended a course on public health laboratory and diagnostic procedures.

4200 Nutrition (1965-) R—To implement a national food and nutrition policy, train health service and hospital personnel in nutrition, and develop nutrition education and food supplement programmes.

4900 Health and population dynamics: meeting, Santo Domingo (13-16 March 1972) PK—The services of a medical officer and financial support were provided for a meeting between the Dominican National Council of Family and Population and representatives of UNFPA, FAO, UNESCO, USAID, the Population Council (USA), and the International Planned Parenthood Federation, to discuss sources of support for the strengthening and expansion of the national maternal and child health and family planning programme.

6200 Medical education (1968-) R—To strengthen medical education, with emphasis on the teaching of preventive medicine.

6300 Nursing education (1958-72) PR PG: Organization of American States—To strengthen the National School of Nursing by preparing nurses for the faculty, improving physical facilities and areas for field practice, and expanding the curriculum to include public health nursing and courses in teaching and supervision.

6400 Sanitary engineering education (1969-75) R—To revise and improve the teaching of sanitary engineering subjects in the regular civil engineering courses and organize short intensive courses in selected sanitary engineering subjects for the continuing education of professional and auxiliary sanitary engineering personnel.

6600 Dental education (1965-) R—To develop, in the country's two dental schools, new plans of study that will include the preventive and social aspects of dentistry.

Ecuador

0100 Communicable disease control (1968-) UNDP PR—To implement programmes for the surveillance, control and eradication of communicable diseases.

0200 Malaria eradication programme (1956-) UNDP PR UNICEF

0300 Smallpox eradication (1958-65; 1967-) R—To keep the country free from smallpox by maintaining the necessary level of protection of the population and improving the epidemiological surveillance service.

0500 Leprosy control (1968-) R—To intensify the leprosy control programme.

0600 Venereal disease control (1969-73) PR—To improve the services for the control of venereal diseases and increase their coverage.

2100 Engineering and environmental sciences (1968-75) R—To implement activities in the fields of water supply and sewerage, collection and disposal of solid wastes, air and water pollution control, housing and food sanitation, and industrial hygiene and safety.

3100 Health services (1953-) R PR UNICEF—To plan and develop integrated health services and train professional and auxiliary health personnel.

3103 Modernization of rural life (1972-) UNDP/ILO—To organize a programme of integrated social and economic development in the rural areas, including basic medical services, vaccinations, promotion of maternal and child health, food supplementation, and improvement of environmental sanitation.

3301 National Institute of Health (1952-) PR—To strengthen the Institute and extend the health laboratory services.

3400 Health education/family planning (1972-) UNFPA—To expand and consolidate health education services and train national staff and teaching personnel in health educational methods, with emphasis on family life education.

3600 Administrative methods and practices in public health (1971-) PR—To improve the administration of the health services.

3700 Health planning (1969-) UNDP PR—To establish the health planning process as part of the planning for socioeconomic development.

4100 Maternal and child health (1971) PR—Two consultants made an assessment of maternal and child health activities and of the teaching of paediatrics, gynaecology, obstetrics, public health and preventive medicine, in preparation for a programme for developing and improving the relevant services.

4200 Nutrition (1971) R UNDP—To develop a food and nutrition policy, integrate nutrition work into the health services, and train nutrition staff.

4202 Goitre prevention (1966-74) PR—To study the feasibility of using iodized oil for the prevention of endemic goitre in the rural areas, and to evaluate its effectiveness.

4203 Nutrition, Portoviejo (1972) PG: Research Corporation, USA—A grant was provided to assist with the completion of surveys on endemic goitre.

4204 Endemic goitre and mental retardation (1966-71) PG: National Association for Retarded Children, USA—To study the role of endemic goitre in cretinism, deafmutism, and physical and mental retardation, and in particular to assess the effectiveness of intramuscular injection of iodized oil (ethiodol) in preventing the disease in rural areas. Provided—short-term consultants, advisory services, including those of staff of Zone IV project AMRO 4204 (Nutrition advisory services), and supplies and equipment.

From March 1966 a survey to determine the prevalence of goitre and to assess somatic growth and neuromotor, dental and skeletal development in children was carried out among 90% of the population of the locality of Tocachi, where iodized oil was administered, and 70% of that in the control area of La Esperanza, where children were also examined and X-ray studies made for signs of cretinism. A study of the effect of iodized oil on mental capacity and goitre was also made in the town of Malchingui, where some 200 schoolchildren had been inoculated in 1968.

The preventive action was found to be complete in children born to mothers who had received treatment, and there was a drastic reduction in goitre prevalence in the inoculated group as a whole. Seven (1.9%) of the children born in the control group at La Esperanza showed signs of retardation by 1970. The investigation also yielded much data on patterns of growth, child care, dentition, lactation, and morbidity in the 611 children observed since 1966, and on prenatal and obstetric conditions affecting the mothers under observation.

The findings from this project served in the preparation of a large-scale iodization programme implemented, with the assistance of the Organization, in accordance with international standard procedures.

4500 Radiation protection (1969-73) PR—To develop a national radiation protection programme.

4800 Training in hospital administration (1971) PR—A course was held at the Carlos Andrade Marín Hospital of the Social Security Institute for 27 directors of hospitals operated by the Social Welfare Agency, Social Security, the Armed Forces, the Ecuadorian League against Tuberculosis and the Welfare Agency of Guayaquil. Provided—five consultants and advisory services by staff members.

4900 Maternity-centred family planning programme (1972-) UNFPA PK—To improve the maternal and child health services provided by the Isidro Ayora Maternity Hospital, Quito, and provide services for the regulation of fertility; to develop programmes for the training of professional, technical and auxiliary personnel in maternal and child health; to develop research in the biology of human reproduction, fertility, sterility and maternal and child health; and to improve the administration of services for maternal and child health care in the area covered by the programme.

6200 Medical education (1968-74) R—To improve medical education at the undergraduate and postgraduate levels and carry out programmes of continuing education.

6300 Nursing education (1957-) R—To strengthen the teaching in the schools of nursing and expand in-service training for nurses and nursing auxiliaries.

Ecuador (continued)

6400 Sanitary engineering education (1965-) PR—To strengthen the teaching of sanitary engineering in the universities, provide short intensive courses in specific sanitary engineering subjects, and train technical and auxiliary personnel working on environmental sanitation programmes.

6500 Veterinary medical education (1971-75) R—To increase the number of veterinarians and improve the quality of instruction given in the schools of veterinary medicine, in order to meet the need for an increase in the production of animal protein for home consumption and export.

6600 Dental education (1963-) R—To strengthen the teaching of dentistry at the undergraduate and postgraduate levels and provide continuing education for practising dentists.

El Salvador

0200 Malaria eradication programme (1955-) R PR UNICEF

2100 Engineering and environmental sciences (1971-75) UNDP PR—To plan and develop national environmental sanitation programmes, including programmes for water supply and sewerage, industrial hygiene, solid wastes disposal, housing and urbanization, food sanitation, and control of air and water pollution.

2200 Water supplies (1961-) PR—To plan and develop national programmes of water supply and sewerage systems for urban and rural areas.

2500 Air pollution (1970-74) PR—To determine the extent of air pollution in San Salvador through the establishment of a sampling station as part of the Pan American Air Pollution Sampling Network.

3100 Health services (1963-) R PR—To carry out integrated health programmes as part of a national health plan.

3200 Nursing services (1972-) UNDP—To improve the training of nurses and nursing auxiliaries and increase training facilities; to organize continuing education programmes for nurses in key positions; and to carry out studies for the identification of nursing needs and for improving the distribution and utilization of nursing personnel.

3300 Laboratory services (1970-) PR—To develop and strengthen the national health laboratory services and train personnel.

4800 Medical care services (1970-76) R—To improve the organization and administration of the medical care services with a view to extending coverage by 10%, integrate curative and preventive medical care services into a regional system, and train staff.

6200 Medical education (1965-) PR—To strengthen undergraduate, postgraduate and continuing medical education, especially as regards the social and preventive aspects.

6400 Sanitary engineering education (1965-) PR — To strengthen the teaching of sanitary engineering at the University of El Salvador and improve the preparation of professional and auxiliary personnel engaged in environmental sanitation programmes.

French Antilles and Guiana

0200 Malaria eradication programme (1963-) PR

3300 Laboratory services (1967-74) PR—To develop the virus research laboratory of the Pasteur Institute in Cayenne, which is carrying out research on the transmission, reservoirs and epidemiology of virus diseases in the rain forest of French Guiana.

Guatemala

0200 Malaria eradication programme (1955-) R PR UNICEF

0901 Measles control (1972-) PR—To carry out a campaign for vaccinating children against measles.

2100 Engineering and environmental sciences (1969-75) PR—To develop water supply and environmental sanitation programmes in urban and rural areas and to train personnel.

2500 Air pollution (1971-) PR—To install two air-sampling stations in Guatemala City to provide the information necessary for planning air pollution control measures.

3100 Health services (1954-) R PR UNICEF—To improve the organization of the health services and develop them in accordance with the national health plan.

3200 Nursing services (1968-73) PH (Kellogg Foundation)—To improve nursing services and administration.

3300 Laboratory services (1964-) UNDP—To reorganize the health laboratories, train staff, and improve facilities for the production of biologicals.

3500 Health statistics (1972-) PR—To reorganize and develop the health statistics unit in the Ministry of Public Health and Social Welfare, integrate the statistics offices of different agencies into the system and organize health statistics services in the health regions; to revise statistical procedures; and to train statistical personnel.

4900 Health and population dynamics (1972-) PK—To extend health care to 40% of pregnant women and of children under five years of age and family guidance services to 20% of women of childbearing age.

5100 Cancer control (1972-) PK—To train personnel in cytotechnology as applied to the detection of early cervical cancer and premalignant conditions and to provide, in maternity clinics, diagnostic and follow-up services for uterine cancer.

6200 Medical education (1966-) PR—To reorganize undergraduate and postgraduate medical education, and the education of allied health personnel, in accordance with the country's health needs; and to improve the training of teaching staff.

6400 Sanitary engineering education (1967-75) PR VD—To improve teaching and research, and organize a programme of continuing education, at the Regional School of Sanitary Engineering for Central America and Panama, University of San Carlos.

6500 Veterinary medical education (1962-) PR—To improve the teaching at the school of veterinary medicine of the University of San Carlos.

6600 Dental education (1969-) PR—To improve dental education and integrate the teaching of preventive and social dentistry into the curriculum.

Guyana

0200 Malaria eradication programme (1961-) PR

0700 Veterinary public health (1972-) PR—To develop a coordinated zoonoses control programme including the establishment of a veterinary public health unit and laboratories, improve reporting and surveillance systems, and train personnel.

2100 Engineering and environmental sciences (1969-) R—To plan and implement programmes for improving environmental conditions, and to train professional and auxiliary personnel.

2201 Development of potable water supply, sanitary sewerage and storm drainage (1972-75) UNDP (UN)—To carry out a sector study on water supply and sewerage, including technical and economic feasibility studies for water supply, sewerage and storm drainage, in Greater Georgetown, Linden and New Amsterdam; to improve the management and administration of the Guyana water authority; and to train personnel.

2300 Aedes aegypti eradication (1969-74) PR

3100 Health services (1963-) R PR UNICEF—To formulate and implement a national health plan, improve the administrative structure of the Ministry of Health and train personnel.

3200 Nursing services (1965-) UNDP—To develop the nursing services and improve nursing education and administration.

4400 Dental health (1972-) R—To establish a dental health unit, expand dental services through the provision of equipment and materials, train auxiliary dental staff and promote dental health by means of educational and preventive measures.

4900 Health and population dynamics (1971-74) PK—To develop a comprehensive maternal and child health and family health programme.

Haiti

0200 Malaria eradication programme (1961-) PR UNICEF

0600 Yaws control (1950-) R—To implement a yaws control campaign, combined with a smallpox vaccination campaign.

2100 Engineering and environmental sciences (1971-75) PR—To carry out a programme of latrine construction in Mirebalais and neighbouring localities.

2200 Water supplies (1960-) PR—To extend the water supply system of Port-au-Prince and of 12 towns in the interior and construct small water supply systems in other areas.

3100 Health services (1957-) R PR PK PG: Organization of American States UNICEF—To develop integrated public health services at the national and local levels, establish a demonstration area in Les Cayes, and train health personnel.

3105 Public health services (1972-) UNDP—To develop a system of public health services suitable for the whole country.

3300 Laboratory services (1953-) PR—To strengthen and improve the national public health laboratory and the hospital and field laboratories.

4200 Nutrition (1961-) PH PG: Research Corporation, USA UNICEF (FAO) (UNESCO)—To improve the nutritional status of the population through nutrition education, supplementary feeding programmes for vulnerable groups, and other measures.

4900 Health and population dynamics (1970-) UNFPA—To develop an integrated maternal and child health and family planning programme.

6200 Medical education (1968-) PR—To improve the physical facilities, the educational programme, and the system of examinations, of the faculty of medicine.

6300 Nursing education (1968-) PR—To improve the teaching given in the nursing schools and the training of nursing auxiliaries.

6400 Sanitary engineering education (1971-75) PR—To improve the teaching of sanitary engineering and the laboratory and library facilities at the School of Sciences of the University of Haiti.

Honduras

0200 Malaria eradication programme (1956-) R UNICEF

0400 Tuberculosis control (1962-72) R—To plan and implement a tuberculosis control programme integrated into the health services.

2100 Engineering and environmental sciences (1971-75) PR—To improve and strengthen environmental sanitation work.

3100 Health services (1955-) R PR PK—To organize integrated public health services at the central and local levels, and train professional and auxiliary personnel.

3105 Community health services (1972-) PR—To build up the health infrastructure and expand the integrated programme of community health in cooperation with the Social Welfare Board.

3300 Laboratory services (1967-) PR—To organize a central public health laboratory in Tegucigalpa, establish regional laboratories, modernize laboratory techniques and train technical personnel.

4800 Medical care services (1965-74) R—To improve the medical care services, including those of the social security institutions.

4900 Maternal and child health and family welfare (1972-74) PK—To coordinate family planning activities with the regular maternal and child health programme, improve and strengthen standards of care, and collect statistical information.

6200 Medical education (1965-75) R—To organize, in the University of Honduras, a division of health sciences responsible for the integrated teaching of health personnel.

6400 Sanitary engineering education (1965-74) PR—To improve the teaching of sanitary engineering at the University of Honduras, and the advanced professional training of personnel working in national sanitary engineering and environmental sanitation programmes.

Jamaica

2100 Engineering and environmental sciences (1968-) UNDP PR—To strengthen the Sanitary Engineering Department of the Ministry of Health, implement environmental sanitation programmes, including programmes for water supply and waste disposal systems, air and water pollution control and industrial hygiene; and to train professional and auxiliary personnel.

2202 Water resources survey (1972-) UNDP/FAO—To establish a network for the monitoring of water quality.

*Jamaica (continued)***2300 Aedes aegypti eradication (1969-) PR**

2500 Air pollution (1967; 1971-) PR—To install, operate and maintain air sampling stations as part of the Pan American Air Pollution Sampling Network.

3100 Health services (1963-) R PR—To improve the health administration and services and increase the number of trained health personnel, including nurses.

4300 Mental health (1964-) UNDP PR—To improve the level of psychiatric care.

4500 Radiation protection (1968-) PR—To organize a national radiation protection programme.

5000 Rehabilitation (1972-) R—To establish, at the University of the West Indies, a centre for training physical therapists for the part of the Caribbean area where English is spoken.

6100 Public health training centre (1967-) PR—To improve the training of public health personnel at the University of the West Indies' School of Public Health (formerly the Public Health Training Centre) and to reorganize the School.

6301 Advanced nursing education (1965-71) R—To prepare nurses for senior positions in nursing administration or nursing education in the Caribbean area, to develop the programme of nursing education at the University of the West Indies, and to strengthen the basic nursing education programme. Provided—a nurse educator, short-term consultants, advisory services of staff, including those of project Jamaica 3100 (Health services) and Zone I project AMRO 3201 (Nursing), 61 long-term and 14 short-term fellowships, grants in 1971, cost of courses, and teaching aids and books.

A postbasic course in nursing education and administration was introduced at the University in 1965, and 112 students from 14 countries and territories of the Caribbean attended it between 1966 and 1971, of whom 101 graduated, 63 receiving certificates of nursing education and 38 certificates of nursing administration. Follow-up investigations showed that the majority of graduates subsequently took up key positions in the administration of their countries' nursing or nursing education services, and that, although the rate of staff turnover in the area is generally high, 85% were still employed in such services at the end of 1971. Plans were also drawn up for a programme of studies in nursing education leading to a baccalaureate degree at the University.

6600 Dental education (1966-) R—To train dental auxiliaries for providing routine dental care to schoolchildren.

Mexico**0200 Malaria eradication programme (1956-) UNDP PR**

0400 Tuberculosis control (1960-74) R—To improve and extend the national tuberculosis control programme.

0700 Zoonoses control (1966; 1970-) R—To plan and implement programmes for the control of zoonoses, especially brucellosis, rabies and bovine tuberculosis.

2100 Environmental pollution control (1972-75) PR—To identify environmental pollution problems, organize control measures, and plan the development of the federal, state and local agencies concerned.

2200 Water supplies (1960-) R PR—To develop national programmes for water supply and sewerage systems.

3100 Health services (1966-) R—To improve the health services, especially in the rural areas; and to train the necessary health personnel.

3105 Continuing medical education (1968-72) PR—To establish a programme of continuing education for physicians practising in rural areas who do not have ready access to new developments in medical science. Provided—a short-term consultant, two temporary advisers and the advisory services of staff members, grants, and supplies and equipment.

A study was carried out among physicians in the State of Michoacán with a view to a pilot programme of continuing education in rural areas for gradual extension to the rest of the country. The number of practising physicians pursuing medical studies was found to be as low as 2.2% in 1971. In the State of Morelia 27 physicians received in-service training in hospitals and sanatoria in paediatrics, obstetrics, and traumatology, and improvements were made in the techniques for continuing medical education in hospitals and sanatoria in the States of Chihuahua and Durango.

3300 Laboratory services (1958-65; 1967-71) PR—To extend and improve the national health laboratory services; to increase the production of biologicals of good quality to meet the requirements of the country's immunization programmes; and to train laboratory personnel. Provided—short-term consultants, advisory services of staff members, including staff of the Zone II Office, one long-term and 17 short-term fellowships, and vaccine supplies and equipment.

An application was prepared for UNDP assistance in extending and improving the health laboratory services, in particular with a view to the production and testing of vaccines. Bacterial and virus vaccine studies were carried out and procedures for the preparation of sera and toxoids were reviewed, with special attention to BCG and rabies vaccines. Production of freeze-dried BCG vaccine and of rabies vaccines prepared in suckling-mouse brain was started. In this connexion the requirements for breeding of laboratory animals were revised and plans made for the construction of new breeding facilities.

Assistance with health laboratory services will continue under projects Mexico 3302 (Poliomyelitis vaccine production) and 3303 (Modernization of national health laboratories).

3301 Immunology research and training centre (1968-74) PR—To provide postgraduate training in immunology and carry out research on immunological problems of local public health importance, particularly as they relate to infectious diseases.

3302 Poliomyelitis vaccine production (1968-75) PR—To increase the production of live poliomyelitis vaccine at the National Institute of Virology to meet the needs of the Latin American countries.

3303 Modernization of national health laboratories (1970-) UNDP—To modernize the national health laboratories responsible for the production of vaccines and sera, control of food and drugs, diagnosis of infectious diseases, training of personnel and research into public health problems.

4900 Health and population dynamics (1972-) PK—To obtain, over an extended period, sociodemographic data for determining patterns of population change, including information on mortality, morbidity, fertility, and migration.

4901 Seminars on maternity-centred family planning (1972-) PK—To plan and carry out a national maternal and child health and family planning programme, using seminars to further its implementation.

5000 Rehabilitation (1972-) R—To plan and implement a programme for training medical and allied personnel to staff physical, vocational and social rehabilitation services.

6200 Medical education (1958-) R—To improve medical education, especially by providing teaching staff with training in the preventive and social aspects of medical practice.

6300 Nursing education (1958-74) PR—To improve basic nursing education and provide advanced training in nursing education and administration and various nursing specialties.

6400 Sanitary engineering education (1961-74) R PR—To develop sanitary engineering education and research at various universities.

6500 Veterinary medical education (1969-) R—To develop the teaching of preventive medicine and public health in the schools of veterinary medicine.

Netherlands Antilles

2300 Aedes aegypti eradication (1969-) PR

Nicaragua

0200 Malaria eradication programme (1957-74) R PR

2200 Water supplies (1962-65; 1968-75) R—To improve and extend water supply and sewerage services.

2201 Management of national water supplies (1971-) PW—To improve and strengthen the administration of the National Department of Waterworks and Sewerage Systems.

2202 Water supply system administration, Managua (1972-74) PW (International Bank for Reconstruction and Development) (Managua Water Corporation)—To improve the Managua water supply system and strengthen its administrative structure.

3100 Health services (1963-74) R UNDP PR UNICEF (FAO)—To improve health legislation and the structure and administration of the Ministry of Public Health, improve and extend the health services, and train personnel.

3300 Laboratory services (1967-69; 1971-74) PR—To improve and develop the health laboratory services and to train personnel.

4800 Medical care services (1972-74) R—To consolidate the integration of medical care services so far achieved and implement a programme of training in medical care and hospital administration.¹

4900 Health and population dynamics (1972-74) PK—To develop the national maternal and child health and family planning programme at the El Retiro General Hospital, Managua, using the maternity-centred approach.

6200 Medical education (1965-75) PR—To strengthen medical education by improving the training of teachers of basic medical sciences and of preventive and social medicine.

6400 Sanitary engineering education (1965-75) PR—To strengthen sanitary engineering education and organize intensive short courses in sanitary engineering subjects.

6600 Dental education (1966-74) PR—To improve the training at the school of dentistry of the National University.

Panama

0200 Malaria eradication programme (1956-) R UNDP PR UNICEF

2100 Engineering and environmental sciences (1970-74) PR—To strengthen the technical and administrative structure of the Department of Sanitary Engineering of the Ministry of Public Health, to plan and develop environmental sanitation programmes, and to train sanitation personnel.

2200 Water supplies (1960-74) PW (USAID) (National Institute of Aqueducts and Sewerage, Panama)—To improve the operating capacity of the water supply agency and implement national programmes for the construction of water supply and sewerage systems.

2300 Aedes aegypti eradication (1969-) PR

3100 Health services (1952-) R PR—To improve and extend the health services, train health personnel, and promote community participation in the solution of health problems.

4100 Maternal and child health (1971-) R—To extend the medical care provided during pregnancy and childbirth, encourage family planning, improve the health care of children, and expand the immunization programme.

4800 Medical care services (1968-) PR—To expand medical care services, and to integrate health activities so as to achieve a better utilization of the physical resources available.

6200 Medical education (1967-) PR—To improve the administration and technical level of the school of medicine of the University of Panama.

6300 Nursing education (1966-) R PK—To improve basic nursing education, establish postbasic and postgraduate courses in nursing specialties and prepare nurses for teaching posts.

6400 Sanitary engineering education (1965-74) PR—To improve the teaching of sanitary engineering at the University of Panama and organize short intensive courses in sanitary engineering subjects.

6600 Dental education (1966-) R PG: University of Panama—To improve the teaching at the school of dentistry of the University of Panama, especially as regards the preventive and social aspects, and to train auxiliary dental personnel.

Paraguay

0100 Communicable diseases (1965-) PR UNICEF—To implement a communicable disease control programme integrated into the general health services.

0200 Malaria eradication programme (1957-) PR UNICEF

0201 Study of the socioeconomic impact of malaria (1968-) PM—To show quantitatively the effect of malaria in reducing economic productivity in a predominantly agricultural area in process of development, and the economic benefit stemming from eradication of malaria.

0300 Smallpox eradication (1967-) R—To carry out maintenance and surveillance operations in order to keep the country free from smallpox.

¹ For work carried out under this project during the period 1968-71, see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 287.

Paraguay (*continued*)

0700 Veterinary public health (1971-) PR—To carry out a coordinated programme of epidemiological investigations, pilot projects and control measures for reducing morbidity and mortality from the zoonoses, especially rabies, bovine tuberculosis and brucellosis.

2100 Engineering and environmental sciences (1969-) PR—To develop environmental sanitation programmes including programmes for water supply and sewerage, industrial hygiene, waste disposal, housing, and food hygiene.

2200 Water supplies (1961-) PR—To plan and implement a national water supply and sewerage programme.

3100 Health services (1955-) R UNDP PR UNICEF (ILO) (FAO) (UNESCO)—To plan health services at the national level and develop the health service infrastructure to permit coverage of 70% of the population by 1974.

3103 Health services in developing areas (1972-) PR—To improve the health services, and particularly those for mothers and children, in the rural areas.

3500 Health statistics (1971-74) PR—To improve the coverage and quality of vital and health statistics and train statistical personnel.

3600 Administrative methods and practices in public health (1971-) R—To improve the structure, organization and operation of the administrative services of the Ministry of Public Health and Social Welfare.

4100 Maternal and child health (1970-71) PR—To extend the maternal and child health care services, especially in rural areas, and to train personnel. Provided—advisory services by staff members, including staff of Zone IV Office.

In 1970 an analysis was made of manpower and material resources and their utilization in maternal and child health services; the regulations and manuals governing the services were revised, including those applicable to the training of midwives. Special courses were attended by 120 midwives, and four seminars were held on organization and evaluation of the services. In 1971, three seminars on clinical and social paediatrics were attended by a total of 75 physicians, and further courses were held for 116 midwives.

4200 Nutrition (1960-66; 1971-74) R—To implement programmes, including applied nutrition programmes, for improving the nutritional status of the population, placing emphasis on the protection of the most vulnerable groups; and to train the necessary personnel.

4300 Mental health (1972-) R—To determine the prevalence and incidence of mental illness, formulate a mental health policy, and set up the organization for its implementation, coordinating the activities of the institutions working in this field.

4800 Medical care services (1970-) PR—To develop the medical care services and improve their administration; and to train staff.

4900 Health and population dynamics (1971-75) PK—To improve maternal and child care in rural clinics and in the Clinical Hospital, Asunción; and to organize a residency programme in obstetrics, gynaecology and paediatrics in the faculty of medicine of the National University.

6200 Medical education (1964-) PR—To strengthen medical education by promoting teaching programmes in preventive and social medicine at the undergraduate and postgraduate levels and improving teaching methods.

6400 Sanitary engineering education (1967-) R—To strengthen the teaching of sanitary engineering at the faculty of engineering of the National University and organize courses in environmental sanitation subjects for professional, technical and auxiliary personnel.

6500 Veterinary medical education (1971-) PR—To strengthen veterinary medical education, particularly in relation to preventive medicine and public health.

6600 Dental education (1966-) PR—To strengthen the teaching at the dental school of the National University, Asunción, particularly as regards the integration of preventive and social dentistry into basic and clinical courses, and to develop field training programmes for dental students.

Peru

0200 Malaria eradication programme (1957-74) PR UNICEF

0300 Smallpox eradication (1967-) R—To protect the country against smallpox by means of systematic vaccination of 90% of the population and epidemiological surveillance carried out by the health services.

0700 Veterinary public health (1966-74) R—To control brucellosis in goats in the Departments of Lima and Ica and the Province of Callao; and to reduce the incidence of the disease in man.

0701 Rabies control (1970-75) R—To control human and canine rabies in Lima and Callao.

0900 Plague control (1963-) PR—To carry out epidemiological studies of plague and implement a control programme.

1000 Chagas' disease (1970-74) R—To carry out surveys to determine the extent of infection with Chagas' disease, clinical and epidemiological studies, and vector control measures.

2100 Engineering and environmental sciences (1968-) PR—To plan and carry out environmental sanitation work including the establishment and improvement of water and sewerage systems, waste disposal, air and water pollution control, housing and urbanization, food sanitation, and training of engineers and auxiliary personnel.

2200 Water supplies (1960-70; 1972-) R—To extend water supply and sewerage facilities.

2202 Water supply and sewerage services administration, Lima (1970-) PW—To improve the administration of the Lima Sanitation Corporation.

2203 Water supply and sewerage services administration (1972-74) PW (Inter-American Development Bank) (Directorate-General of Sanitary Works)—To constitute a team of national consultants of the Directorate-General of Sanitary Works in order to reorganize the administrative structure of the water supply systems in several major cities, beginning with Ica and Trujillo.

2500 Air pollution (1967-) PR—To determine air pollution levels, plan control measures, and train professional and auxiliary personnel for their implementation.

3100 Health services (1956-) UNDP PR—To strengthen and extend the health services in accordance with the national health plan.

3106 Health services, Piura and Tumbes (1970-74) R PR UNICEF—To develop and extend integrated health services in the two Departments.

4100 Maternal and child health (1972-74) PR PK—To improve and extend activities for the health care of mothers and children.

4200 Nutrition (1965-) R UNICEF (FAO)—To implement an applied nutrition programme including nutrition education, measures to improve food production and increase the use of locally produced foods of high protein content, and improvement of hospital diet.

4202 Nutrition rehabilitation centres in the highlands (1967-) PG: Research Corporation, USA—To continue the work of the nutrition rehabilitation centres that have been established in the central highlands.

4300 Mental health (1972-) PR—To establish a mental health policy, improve the administration and organization of the mental health institutions, develop rehabilitation services in hospitals, organize a system of mental health services oriented towards the community, and train specialized personnel.

4800 Medical care services (1970-74) PR—To strengthen the administrative and technical systems of the central air force hospital, and improve the organization of the country's hospital system.

5101 Cancer control (1971-74) PR—To establish a comprehensive programme for the detection and control of cancer of the uterine cervix, first in metropolitan Lima and later throughout the country.

6100 School of public health (1963-) R PR—To strengthen the School of Public Health, which trains professional and middle-grade technical personnel and health auxiliaries for the public health services.

6101 Interdisciplinary action in health (1972-) PR—To carry out, together with the national universities, a multidisciplinary teaching programme for specialists in the health sciences (consisting of workshops, conferences, seminars and round-table discussions) in Arequipa, Cajamarca, Lambayeque and Puno.

6200 Medical education (1964-) PR—To strengthen the training of physicians at the undergraduate and postgraduate levels, improve the training of teachers, and introduce curriculum changes to place more emphasis on the preventive and social aspects of medical practice.

6201 Training programme for instructors in biochemistry and physiology (1971-73) PH—To implement a programme for the training of teachers of biochemistry and physiology at the University of San Marcos.

6300 Nursing education (1959-) R—To strengthen the teaching of nursing in the five universities.

6400 Sanitary engineering education (1964-) PR—To strengthen the teaching of sanitary engineering at the National University of Engineering, improve laboratory and library facilities and develop applied research projects.

6500 Veterinary medical education (1965-74) R—To revise the plans of study in the schools of veterinary medicine.

6600 Dental education (1969-) PR PH PG: Overseas Development Administration, United Kingdom—To review the curricula of the schools of dentistry and strengthen the teaching programmes, especially as regards the social and preventive aspects of dentistry.

Surinam

0200 Malaria eradication programme (1957-74) PR

0700 Veterinary public health (1971-75) PR—To develop measures for the control of zoonoses and set up a veterinary laboratory.

2100 Engineering and environmental sciences (1971-) PR—To plan and implement a general environmental sanitation programme and a rural water supply programme.

2200 Water supplies (1964-) UNDP—To plan and design piped water supply and sewerage systems for communities in the Lower Surinam River basin (excluding Paramaribo) and the heavily populated coastal area, and for selected inland communities.

2300 Aedes aegypti eradication (1969-74) UNDP PR

3100 Health services (1965-) PR—To improve and extend the health services in accordance with the national health plan, improve their administration, and train health personnel.

6200 Medical education (1968-75) PR—To strengthen and improve medical education at the University of Surinam, Paramaribo.

Trinidad and Tobago

0100 Epidemiology (1969-) R—To train staff in various aspects of communicable disease control.

0900 Poliomyelitis control (1972-) PH—To carry out a poliomyelitis vaccination campaign, using Sabin oral vaccine.

2100 Engineering and environmental sciences (1969-) PR—To reorganize the environmental health services of the Ministry of Health and train professional and auxiliary personnel for environmental sanitation work.

2200 Water supply and sewerage administration (1972-) PW (Inter-American Development Bank) (Trinidad and Tobago Water and Sewerage Authority)—To reorganize the administrative structure of the Water and Sewerage Authority, design manuals and implement procedures to ensure optimum use of the Authority's resources.

3100 Health services (1968-) R PR UNICEF—To improve the planning and organization of the health services.

3500 Health statistics (1969-) R—To establish, in the Ministry of Health, a health statistics system to provide data for use in planning, evaluating and operating the health services.

4800 Hospital administration and medical records (1965-) UNDP—To reorganize the general hospital in Port of Spain, organize medical records departments in the hospitals, clinics and health centres of the Ministry of Health, and train personnel in medical record keeping.

4900 Health and population dynamics (1969-74) UNFPA PK—To plan and carry out a national family planning programme within the basic health services.

Trinidad and Tobago (continued)

4902 Trinidad centre for training in cervical cytology (1971-) PK—To train personnel of countries in the Caribbean area in exfoliative cytology and provide services for diagnosis of pre-cancerous lesions and early malignant lesions of the cervix uteri in women participating in the family planning programme.

United States of America

3100 Consultants in specialized fields (1958-) R—To provide consultant services on specialized problems in public health.

Uruguay

0100 Epidemiology (1972-) PR—To organize, at the central level, a team for coordination of epidemiological surveillance; to carry out surveys and prepare programmes for communicable disease control, starting with venereal diseases and rabies; to train personnel in epidemiology; and to improve data collection and analysis.

0300 Smallpox eradication (1967-) R—To keep the country free from smallpox by a programme of vaccination and epidemiological surveillance measures.

0702 Hydatidosis control (1971-74) PR—To expand and intensify the hydatidosis control programme.

1000 Chagas' disease (1966; 1968-) PR—To carry out a programme, based on the systematic spraying of houses with insecticides, for the control of Chagas' disease.

2100 Engineering and environmental sciences (1968-74) PR—To plan and implement environmental sanitation programmes and train personnel.

2200 Water supplies (1960-) PR PW—To plan and implement national water supply and sewerage programmes.

3100 Health services (1955-) R PR—To develop the health services in accordance with a national health plan, reorganize their technical and administrative structure at the national, regional and local levels, and train the necessary health personnel.

3300 Laboratory services (1971-) PR—To organize a national system of health laboratory services.

3500 Health statistics (1965-) R—To establish a national health statistical system.

4300 Mental health (1965-) PR—To improve the statistical information on mental health problems, draw up a mental health programme and train personnel.

4600 Occupational health (1967-74) PR—To control occupational diseases in industry.

4800 Medical care services and hospital administration (1966-) UNDP PR—To reorganize and improve the medical care and hospital services and train personnel.

4900 Health and population dynamics (1971-) PK—To improve maternal and child health and family planning activities in semirural areas and train the necessary personnel.

5100 Rheumatic diseases (1971-75) PR—To establish a national rheumatology service, develop a national programme for the control of rheumatic diseases, carry out epidemiological research on these diseases, and establish a centre for specialized training of physicians from the western hemisphere.

6100 Training of health personnel (1971-74) PR—To provide training (short courses, seminars and working groups) for staff with technical and administrative responsibilities in the health services.

6201 University of the Republic (1971-) R—To strengthen the programme of the various schools of the University of the Republic, specifically with regard to the teaching of medicine, veterinary medicine, odontology, chemistry, pharmacy, and engineering.

Venezuela

0300 Smallpox eradication (1969-71) R—To keep the country free from smallpox. Provided—advisory services by staff members, including staff of Zone I Office, and supplies and equipment.

The vaccine production equipment was installed and personnel trained in its operation. Over a million people were vaccinated in 1969, the target being to vaccinate 20% of the population annually. A study showed that smallpox, the last indigenous case of which occurred in 1954 and the last imported case in 1962, could be considered to have been eradicated from Venezuela.

0700 Veterinary public health (1972-) R PG: Government of Venezuela—To plan and implement national programmes for the prevention and control of zoonoses and conduct programmes of continuing education for professional veterinary workers.

0701 Venezuelan equine encephalitis (1971-) PR—To carry out epidemiological investigations of Venezuelan encephalitis and develop a stable and effective vaccine.

2101 Chemical and industrial contamination (1971-72) R—A consultant studied the effects of chemical and industrial contaminants from the Tablazo Petrochemical Complex in the fish and ecosystems of Lake Maracaibo and Tablazo Bay.

2200 Water supplies (1960-73) PW (National Institute of Sanitary Works, Venezuela)—To reorganize the National Institute of Sanitary Works.

2500 Air pollution (1967-69; 1971-) PR—To carry out investigations for the determination of air pollution levels.

3100 Health services (1964-) R PR—To improve the administration and organization of the health services and extend their coverage; and to train health personnel.

3200 Nursing services (1972-) PR—To prepare and implement a long-term plan for the delivery of nursing care, including the preparation of the necessary personnel, in accordance with the country's health policy and its socioeconomic situation.

3300 Laboratory services (1966-) PR—To organize laboratory services at the national, regional and local levels and train personnel in modern laboratory practices.

3301 National Institute of Hygiene (1964-) UNDP—To improve the organization and programmes of the Institute.

3600 Administrative methods and practices in public health (1972-) R PR—To improve the administration of the health services and prepare relevant legislation.

4200 Nutrition (1965-74) R—To formulate a nutrition policy and develop a programme for improving the nutritional status of the population.

4300 Mental health (1964-) R—To extend and improve the mental health services.

4401 Dental materials centre (1969-74) R PH—To develop training and research, and the quality control and standardization of dental materials, at the Centre for Dental Materials established in the School of Dentistry of the Central University, Caracas, in 1969.

4500 Radiation protection (1970-) R—To plan and implement a national radiation protection programme.

4800 Medical care services (1966-) R—To coordinate the medical care services provided by the hospitals and health centres, extend medical care facilities, and train the necessary personnel.

4804 National system of maintenance and engineering of health care facilities (1972-76) UNDP—To develop a national system of engineering and maintenance of hospitals and other health care facilities.

5000 Rehabilitation (1967-74) R—To strengthen and develop rehabilitation services and train personnel, including orthotics and prosthetics technicians.

6100 School of public health (1961-) R—To develop the school and improve its programmes of study.

6200 Medical education (1958-74) PR—To improve medical education, particularly as regards the teaching of preventive medicine and the basic medical sciences.

6300 Nursing education (1959-71) PR—To improve nursing education. Provided—long-term and short-term consultants, advisory services, including those of staff of project Venezuela 4300 (Mental health) and Zone I project AMRO 3201 (Nursing), and 30 fellowships.

When the project started there were only auxiliary nurses with four years of primary education and a very few graduate nurses with a baccalaureate diploma awarded after a three-year course; almost none had received advanced training. By 1971 the percentage of graduate nurses with the diploma had risen to 25%, 60 nurses had obtained a bachelor's degree in nursing and 10 a master's degree. Several obtained degrees in nursing education, psychology and other subjects. Nursing training procedures have been completely revised in a recent educational reform providing for programmes of studies at university schools of nursing within two medical schools. These were attended by 112 students in basic nursing and 59 graduates working for the bachelor's degree. Preparations were also made for certain faculty members to take a master's degree. A diploma programme in patient care for middle-grade personnel was organized in 13 schools in 1969, and 1939 students enrolled. Courses were held simultaneously for nursing auxiliaries and many institutions provided in-service training. Postbasic studies in nursing administration and education and in various clinical and other subjects were also organized, including paediatric, obstetric and psychiatric nursing and intensive care.

6401 Sanitary engineering research centre (1971-74) UNDP FT—To establish a sanitary engineering research centre for quality control of air, water and soil.

6500 Veterinary medical education (1966-74) R—To improve the teaching of veterinary medicine, especially as regards preventive medicine and the basic veterinary sciences.

6600 Dental education (1966-74) R—To train auxiliary dental personnel and strengthen the programme for the teaching of dentistry, particularly as regards the preventive and social aspects.

West Indies

0700 Veterinary public health (1972-) PR—To plan and implement national programmes for the prevention and control of zoonoses and conduct programmes for the continuing education of professional veterinary workers.

2101 Engineering and environmental sciences, Montserrat (1972-) UNDP—To train environmental health personnel.

2200 Water supplies (1962-) UNDP—To improve and extend water supplies in the islands of the eastern Caribbean and improve the administration and operation of the systems.

2300 Aedes aegypti eradication (1969-73) R—To eradicate *Aedes aegypti* from Antigua, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Montserrat, St Kitts, St Lucia and St Vincent.

3100 Health services (1969-) R—To formulate and implement health programmes as part of plans for socioeconomic development in the islands of the eastern Caribbean.

3106 Health services, St Vincent (1968-) PG: International Society for Rehabilitation of the Disabled UNICEF—To implement the integrated health programme, and to carry out evaluations to provide the basis for the preparation of a national health plan.

3108 Health services, Grenada (1969-74) PR—To strengthen the health services and train staff.

3110 Health services, Bahamas (1972-) R PR PG: Government of Bahamas—To revise and update legislation relating to public health and to food and drugs.

3300 Laboratory services (1968-) PR—To develop the laboratory services in Dominica to enable them to provide specialized pathology services for the island and for Antigua, Montserrat and St Kitts.

3301 Medical laboratory technology, Bahamas (1972-) UNDP—To provide training in medical laboratory technology.

3500 Health statistics (1970-) PR—To develop health statistics services in the eastern Caribbean islands and train the necessary staff.

4200 Nutrition (1962-) R UNICEF (FAO)—To improve the nutritional status of the population of the islands of the eastern Caribbean through applied nutrition programmes, nutrition education programmes and the development of nutrition services.

4300 Mental health (1969-) PR—To plan and develop mental health services.

4800 Medical care and hospital administration (1969-) UNDP—To improve the administration and operation of hospitals in the eastern Caribbean islands.

4809 Hospital administration, Cayman Islands (1971-) UNDP—To improve hospital administration.

4812 Hospital administration, Antigua (1972-74) UNDP—To reorganize the administrative structure and management of the Holberton Hospital and train personnel in hospital administration.

West Indies (continued)

4900 Health and population dynamics (1972-) PK—To develop nursing and midwifery services for maternal and child health and family planning programmes in the Caribbean islands where English is spoken.

4901 Family planning programme, St Kitts/Nevis (1971-74) UNFPA—To develop an integrated maternal and child health and family planning programme.

4903 Family planning programme, Dominica (1972-) UNFPA—To provide family planning information and services in hospitals and health centres, as part of a comprehensive maternal and child health programme.

6302 Training of nursing assistants, Cayman Islands (1971-73) UNDP—To train 30 auxiliary nurses in three years, through an annual nine-month in-service programme, to work as members of the health team in both preventive and curative fields.

AMRO

0100 Epidemiology, interzone (1971-) PR; **0101 Zone I (1972-)** PR; **0102 Zone II (1965-)** PR; **0103 Zone III (1961-)** PR; **0104 Zone IV (1966-)** PR; **0106 Zone VI (1958-)** PR—To assist countries in developing programmes for the control of communicable diseases, in establishing epidemiological and laboratory services, and in training personnel.

0108 Research training programme in virology (1962-74) PR—To study the ecology of Venezuelan encephalitis virus and other pathogenic arboviruses, including the possible role of migratory birds in the long-distance transport of arboviruses; and to provide training in field and laboratory research methods.

0114 Surveillance and research on infectious diseases along the Trans-Amazon Highway (1971-75) PR PS PG: US Army Medical Research and Development Command—To carry out multidisciplinary studies on (i) diseases and their causative agents introduced by the work force and colonists coming from other parts of Brazil; (ii) local diseases and infectious agents of the Amazon area which may affect the immigrants; (iii) reservoir hosts among the wild animals; and (iv) the role of certain arthropod vectors.

0200 Malaria technical advisory services, interzone (1955-) R PR; **0201 Zone I (1969-)** PR; **0203 Zone III (1958-)** PR—To provide technical advisory services and local training in certain aspects of country programmes for which long-term appointments of advisers are not necessary.

0216 Research in the epidemiology of malaria eradication in problem areas (1966-74) PR PM—To investigate possible methods of interrupting the transmission of malaria in areas where technical problems have been encountered.

0218 Rural health services and malaria eradication campaigns (1967-) PR—To assist countries in coordinating and subsequently consolidating malaria eradication activities with the general health services in rural areas.

0300 Smallpox eradication, interzone (1951-) R PR; **0304 Zone IV (1968-)** R—To assist countries with their smallpox eradication programmes, particularly as regards the development of surveillance systems and maintenance programmes and the production of smallpox vaccine.

0400 Tuberculosis control, interzone (1957-) R; **0402 Zone II (1969-)** R; **0403 Zone III (1963-)** PR; **0404 Zone IV (1962-)** R; **0406 Zone VI (1967-)** R—To assist countries in the planning, implementation and evaluation of

programmes, in conducting operational studies and research on tuberculosis control, and in training personnel in control methods and techniques.

0408 Seminar on tuberculosis, Bogotá (6-10 Nov. 1972) R—To make a critical review of national tuberculosis control programmes, discuss difficulties encountered in their execution, and recommend guidelines for realistic and efficient control programmes within the framework of national health services. There were 39 participants from all countries of the Region. Provided—consultant services, and the cost of attendance of participants.

0409 Courses in tuberculosis epidemiology and control (1969-70; 1972-75) R—To train heads of tuberculosis programmes in the basic principles of tuberculosis control administration and in epidemiological methods for evaluation of the tuberculosis problem.

0410 Courses on tuberculosis bacteriology (1969-75) R—To train senior laboratory personnel in tuberculosis bacteriology methods and techniques.

0500 Leprosy control, interzone (1958-) PR—To assist countries in developing leprosy control programmes, integrating them into the general health services, and training personnel.

0507 Courses on rehabilitation and prevention of disabilities caused by leprosy (1967-68; 1972-) R—To train medical personnel in methods of preventing and treating disabilities caused by leprosy.

0509 Courses on histopathology of leprosy (1971-) R—To provide pathologists with training in the histopathological diagnosis of leprosy, to enable them to assist with the diagnosis of leprosy and to train other pathologists in this work.

0600 Venereal diseases and treponematoses, interzone (1961-) PR—To assist governments with the organization and administration of venereal disease and treponematoses control programmes.

0700 Pan American Zoonoses Centre, Argentina (1956-) R UNDP PR PG: Various—To advise countries of the Region on the establishment and improvement of veterinary public health services and zoonoses control programmes; to carry out research on the most prevalent zoonoses; and to train technical personnel for zoonoses control work.

0701 Veterinary public health, Zone I (1972-) R PR; **0702 Zone II (1968-)** PR; **0703 Zone III (1957-)** R; **0704 Zone IV (1968-)** R—To assist countries in developing veterinary public health services and education with special reference to zoonoses control and food protection.

0708 Rabies control, interzone (1971-) PR—To improve techniques for the diagnosis of rabies, test new vaccines, develop other control methods, and collaborate with international agencies working on rabies control in the Americas.

0710 Rabies control, Mexico/United States border (1966-) PG: US Public Health Service Centre for Disease Control—To assist the Governments of Mexico and the United States of America in eliminating rabies in dogs and other animals along the border between the two countries.

0719 Census of primates (1972-) PG: National Academy of Science, USA—To determine, in Colombia and Peru (Iquitos), the areas where trapping and transport of primates take place; to obtain information on the movements of the primate population and on reproduction, mortality and related biological factors; and to formulate recommendations for the management and conservation of primates in both countries.

AMRO (continued)

0800 Pan American Foot-and-Mouth Disease Centre, Rio de Janeiro (1951-) PR PG: Government of Brazil; Government of Mexico; Inter-American Development Bank—To assist the countries of the Americas in the control and prevention of foot-and-mouth disease and other vesicular diseases, the conduct of research related to the preparation and testing of vaccines, and the training of personnel.

0920 Cholera (1972) R—An interregional course on enteric infections and cholera was held in Rio de Janeiro with 20 participants from 10 countries. In addition two laboratory workshops on enteric infections were held to review problems and update methods for the collection and bacteriological examination of specimens in connexion with the diagnosis of infections caused by *Shigella dysenteriae*, type 1, *Salmonella typhi*, and *Vibrio cholerae*. One was held in Jamaica and had 11 participants from 9 countries and territories in the Region; the other, held in Panama, had 10 participants from 9 countries in the Region.

1000 Parasitic diseases, interzone (1966-) R—To assist countries with programmes for the control of parasitic diseases and in the development of research on control methods.

1007 Schistosomiasis (1960-) PR—To foster the development of national programmes of schistosomiasis control and research.

1008 Chagas' disease (1960-) PR PG: Wellcome Trust—To determine the epidemiological characteristics of Chagas' disease, its prevalence and its severity, provide support for national control programmes and encourage related research and training activities.

2100 Engineering and environmental sciences, interzone (1958-) PR; **2101 Zone I (1960-)** PR; **2102 Zone II (1960-)** R; **2103 Zone III (1960-)** PR; **2104 Zone IV (1960-)** PR; **2106 Zone VI (1960-)** PR; **2107 Caribbean area (1956-)** UNDP—To assist countries with various engineering and environmental sanitation activities, including collection and disposal of solid wastes, food sanitation, school sanitation, sanitation of public establishments and transport, vector and rodent control, and training of auxiliary personnel.

2114 Pan American Centre for Sanitary Engineering and Environmental Sciences, Lima (1968-) R PR PG: Government of Peru—To develop the Centre, which provides countries of the Region with specialized technical and scientific assistance in sanitary engineering and environmental sciences, collects and disseminates information on new developments and methods, and carries out training and research work.

2118 Regional pollution monitoring network (1970-) UNDP—To develop practical approaches to the monitoring of environmental pollutants in the Americas.

2200 Water supplies, interzone (1959-) R PR; **2203 Zone III (1964-)** PR—To advise countries on the planning, financing and execution of water supply programmes and on the organization and administration of central and local water supply and sewerage authorities.

2213 Studies on water resources (1965-) PR—To assist in the study of (i) water resources of the Region and their present and future use, and (ii) the problems of waste water disposal and the resultant pollution of surface water and groundwater.

2219 Water meters (1969-72) PG: Inter-American Development Bank—To test various water meters under different conditions; to publish a reference manual giving technical

information including specifications and uses of meters; and to give relevant advice and training. Provided—six short-term consultants, advisory services by staff members, and training and research costs.

In the first part of the project, for which a PASB staff member served as project coordinator, the Reference Manual on Water Meters was prepared at the Pan American Centre for Sanitary Engineering and Environmental Sciences with the assistance of staff of the Centre, and was submitted to field staff for comment. It includes analyses of all types of water meters made in countries of the Americas, with illustrations and specifications, a list of manufacturers in the western hemisphere, and guidelines and criteria for selection and purchase. Secondly, research was carried out on the behaviour of meters under similar conditions in the dwellings of families with higher, medium and low incomes in Guatemala City, Bogotá and São Paulo, with the collaboration of the University of San Carlos, Guatemala, the National University of Colombia, the University of São Paulo, and local water authorities.

Thirdly, a seminar on policies and methods in the selection and purchase of water meters was held at the University of San Carlos in February 1972 for 35 participants from nine countries of Middle America.

2220 Institutional development of environmental services (1970-) R PR PW—To assist the institutions in Latin America concerned with water supply and sewerage services, and with such activities as solid waste disposal and atmospheric pollution control, in improving their operation and administration, and in training personnel for that purpose.

2223 Seminars on public services administration (1972-74) PR—To discuss new developments in the administration and management of water supply and sewerage services, with a view to evolving a system suitable for use in the Region.

2224 Symposium on New Methods of Water Treatment, Asunción (14-18 Aug. 1972) R—To promote programmes on the transfer of technology relative to new methods of water treatment. The technical organization of the symposium was done by the Pan American Centre for Sanitary Engineering and Environmental Sciences. There were 129 participants from 22 countries of the Region and representatives from the International Bank for Reconstruction and Development and the Inter-American Development Bank attended. Provided—six consultants and services of three staff members who introduced the main subjects.

2226 Rural water research project (1972-) PG: International Bank for Reconstruction and Development—To study the economic and health benefits that may be derived from supplying potable water in rural areas, as a basis for developing a set of criteria for acceptance by the International Bank of applications for loans for rural water supplies.

2300 Aedes aegypti eradication, interzone (1954-) PR; **2301 Caribbean area (1950-)** UNDP PR; **2303 Zone III (1968-)** PR—To assist with *A. aegypti* eradication campaigns and with the organization of vigilance services.

2308 Scientific Advisory Committee on Dengue in the Americas, Port of Spain, Trinidad (22-24 March 1972) R—To review activities during the preceding two years and make recommendations for the improvement of dengue and yellow fever surveillance throughout the Caribbean area. This second meeting of the Scientific Advisory Committee had 12 participants (temporary advisers).

AMRO (continued)

2310 Cost/benefit study on the prevention of *Aedes aegypti*-borne diseases (1971-) PG: Department of Health, Education and Welfare, USA—To study the economic impact of diseases transmitted by *A. aegypti* in relation to the cost of various preventive measures.

2400 Public health aspects of housing and urbanization (1962-71) PR—To increase knowledge of health and environmental sanitation among officials responsible for the planning and implementation of projects for low-cost housing and urbanization in the countries of the Region. Provided—a sanitary engineer, and advisory services of staff members.

The sanitary engineer cooperated in the long-term planning of housing and urbanization programmes, in which particular emphasis was placed on community self-help, and assisted at the Inter-American Housing and Planning Centre in the training of students in subjects related to health and environmental sanitation as they apply to housing and urban development. He also took part in the interagency missions establishing the basis for rural housing programmes in Colombia, Ecuador, Trinidad and Tobago and Venezuela, and in research activities at the Centre and in several countries of the Region. Advice was given on the establishment of health standards for housing and on programme implementation. In addition, the Organization cooperated with the United Nations Economic Commission for Latin America and participated in the elaboration of the standards governing urbanization that are at present in use in many countries of the Region.

Assistance will continue under project AMRO 2114 (Pan American Centre for Sanitary Engineering and Environmental Sciences, Lima).

3107 Public health administration, Caribbean area (1963-) R PR—To assist the governments in the Caribbean area in formulating and implementing health programmes within their plans for social and economic development and to promote coordination of programmes and the sharing of specialized services.

3108 Public health services, United States/Mexico border (1952-) R PR—To cooperate in the joint study and planning of health activities along the United States/Mexico border; promote the exchange of epidemiological information between the two countries; and carry out the duties of Secretariat of the United States/Mexico Border Public Health Association.

3110 Research development and coordination (1962-) PR PG: National Institutes of Health, USA—To develop and implement a biomedical research programme in fields directly relevant to health problems of the Region; to promote cooperation among biomedical scientists of different countries in order to make the best possible use of existing resources for research and research training; to strengthen biomedical communications and resources; and to improve the returns from health expenditure through the application of operations research methods to the planning and administration of health programmes.

3125 Special seminars, Zone III (1970-) PR—To cooperate with the countries of the zone in arranging seminars and meetings of working groups in various public health disciplines to analyse the relevant problems and activities and make recommendations to the Central American Public Health Council.

3126 Operations research (1970-) PR—To promote the application of the concepts and methodology of operations research to the solution of health problems.

3129 Research training in biomedical sciences (1969-) PR PK PG: Wellcome Trust—To provide research training in the biomedical sciences, within the Region, for workers from countries of Latin America and the Caribbean area.

3131 Caribbean Health Ministers' conference (1970-) R PR—To assist the countries of the Caribbean area in the establishment of a secretariat for conferences of the Ministers of Health.

3135 Development of river basins (1972-) PR—To collaborate with governments in the development of river basins by providing advisory services on the study of costs and benefits, on the potential dangers to health arising from the development of water resources, on the protection and promotion of health, especially of the labour force and of families in the basin areas, and on the determination of technico-economic models of development.

3137 Programme on traffic accidents (1972-) PR PG: National Institutes of Health, USA; Government of Venezuela—To establish a clearing-house for information on traffic accidents; to advise countries on accident prevention; to convene international seminars that will discuss problems of common interest, outline policies and propose programmes; and to promote field research.

3138 Diagnostic efficacy of spherulin (1972-) PS—To evaluate the diagnostic efficacy of spherulin in persons sensitized by infection in parts of Mexico where coccidioidomycosis is endemic.

3200 Nursing services, interzone (1968-74) PR; **3201 Nursing, Zone I (1959-)** PR; **3202 Zone II (1963-)** PR; **3203 Zone III (1963-)** PR; **3204 Zone IV (1952-)** PR; **3206 Zone VI (1963-)** PR—To assist countries in the planning, organization and administration of nursing services, in developing educational programmes for professional and auxiliary nursing and midwifery personnel, and in carrying out research on nursing.

3211 Seminars on planning for nursing (1969-) R—To assist countries in preparing nurses to participate in the planning of nursing activities.

3214 Programming for nursing (1971-) PR—To assist countries in developing a system of nursing geared to the needs of their health programme and to their social, cultural and economic characteristics.

3215 Study of factors affecting growth of the nursing profession (1972-) PR—To identify the factors affecting the growth of the nursing profession.

3216 Standards in nursing practice (1972-) PR—To improve the nursing care of patients by setting standards for Mexico and the countries of Central and South America and the Caribbean area.

3217 Definition of elements required in nursing planning (1972-) PR—To determine what information is needed for the planning of nursing services and the sources from which it can be obtained.

3300 Laboratory services, interzone (1955-) R; **3302 Zone II (1972-)** PR; **3303 Zone III (1965-)** PR; **3304 Zone IV (1972-)** PR; **3306 Zone VI (1970-)** R—To assist countries of the Region in improving health laboratory services and in the production and control of biological products, the training of personnel, and the development of investigations for the identification of health problems and of epidemiological research.

3311 Training of laboratory personnel (1968-) PR—To improve the training of laboratory personnel by providing short intensive courses on specific subjects.

3314 Trinidad Regional Virus Laboratory (1969-) PR—To assist the Laboratory in continuing and developing its diagnostic and virus disease surveillance work.

3315 Immunology research and training centre, São Paulo (1969-) R—To provide postgraduate training in basic immunology for candidates from Latin American countries, and develop immunological research projects related to public health problems in those countries.

3316 Production and quality control of biologicals (1972-) R—To assist countries of the Region to increase and diversify the production of biologicals in existing laboratories, and to improve their quality and distribution.

3400 Health education, interzone (1968-) PR; **3401 Caribbean area (1963-)** UNDP—To assist governments in developing health education services and in training health personnel in health education and related disciplines.

3402 Health education aspects of family planning (1971-72) UNFPA—Consultants were provided to advise on the development of the maternal and child health education plan for Central America and to assist the health education programme in El Salvador.

3407 Regional Centre for Functional Literacy in Rural Areas of Latin America (1951-53; 1960-71) R—To cooperate in training students at the Regional Centre for Functional Literacy, in Mexico, for the performance of health education work as a part of literacy programmes. Provided—a medical officer, and advisory services of staff of Zone II Office.

In 1961 the Centre, which had been established as the Regional Centre of Fundamental Education for Latin America in 1951, became a regional education centre for community development. A total of over 1500 specialists from nearly all the Latin American countries were trained in 37 courses on fundamental education, community development or functional literacy; public health was an essential element in each course. In 1968 the Centre received its present name and the main emphasis in its work shifted from community development to functional literacy, with a corresponding reduction in the Organization's participation.

3410 Training of teachers in health education (1970-) PR—To assist countries of the Region in improving the health education component of the general education programme and in improving the training of teachers in health education.

3500 Health statistics, interzone (1960-) PR—To develop a regional programme for improving basic statistical data for use in health programmes, to extend training in this field and to develop statistical research.

3501 Health statistics, Zone I (1964-) PR; **3502 Zone II (1958-)** R; **3503 Zone III (1955-)** R PR; **3504 Zone IV (1956-)** R PR; **3506 Zone VI (1959-)** PR—To assist countries in improving their vital and health statistics systems and advise them on the use of statistical data in national health planning and on the statistical aspects of projects.

3513 Inter-American investigation of mortality in childhood (1966-74) R PR PG: USAID—To study child mortality in selected urban and rural areas of Latin America and of the United States of America, in order to obtain accurate and comparable data on death rates in relation to nutritional,

sociological, and environmental factors which may be responsible for excessive mortality.

3515 Centre for training in use of computers in health statistics (1972-) PR—To prepare guidelines for the installation and use of electronic equipment in the health services and for the training of personnel for operation of the equipment.

3516 Regional seminars on data processing (1972-) PR—To hold biennial seminars for the dissemination of information on data processing.

3600 Administrative methods and practices in public health, interzone (1959-) PR; **3601 Zone I (1968-)** PR; **3602 Zone II (1968-75)** PR; **3603 Zone III (1967-75)** PR; **3604 Zone IV (1972-)** PR; **3606 Zone VI (1963-)** PR—To assist countries in improving the administrative practices of their national health services.

3607 Management of health services (1972-) UNDP—To assist governments in improving the management and administration of health services; and to train health administration officials.

3700 Health planning, interzone (1961-) R PR; **3701 Zone I (1965-)** R; **3702 Zone II (1971-)** R; **3703 Zone III (1966-)** PR; **3704 Zone IV (1972-)** PR—To assist countries in the development of health planning processes and in training personnel in this field.

3709 Meeting of Ministers of Health, Santiago, Chile (2-9 Oct. 1972) PR—The meeting, the third of its kind, was attended by 21 Ministers of Health, and 80 Directors of Health and health officers from 28 countries in the Americas. They examined the achievements of the period 1961-1970, analysed the health situation in the different countries and recommended specific goals and strategies for the decade 1971-1980.

3715 Pan American programme for health planning (1968-) UNDP PR—To contribute to the establishment and strengthening of health planning processes through training, research and provision of information.

4100 Maternal and child health, interzone (1971-) R—To assist governments in the development of integrated maternal and child health programmes, including fertility regulation activities when called for, and in the progressive extension of such programmes to rural areas.

4108 Clinical and social paediatrics (1961-) PR UNICEF—To provide fellowships for training in clinical and social paediatrics at the regional training centres in Santiago, Chile, and Medellín, Colombia.

4109 Nursing-midwifery (1961-) PR—To assist countries in the development of the nursing-midwifery component of the maternal and child health programme and in training nurse/midwives.

4117 Research on the nursing aspects of maternal and child health care (1971-) PK—To provide information on the nursing-midwifery aspects of maternal and child health and family planning in order to improve the care of mothers and children.

4126 Latin American Centre for Perinatology and Human Development (1972-) R PR PH PK PG: Ford Foundation—To support the Centre, which carries out research and training and provides advisory services on perinatal problems to the countries of the Region.

AMRO (continued)

4200 Nutrition advisory services, interzone (1958-) R PR—To assist countries with various aspects of work on nutrition, including the formulation and implementation of nutrition policies, the training of nutrition specialists, the establishment or strengthening of nutrition activities in health services, and the organization of nutrition education programmes.

4201 Nutrition advisory services, Zone I (1961-) R—To assist the countries of the zone in the planning, organization and implementation of nutrition programmes as an integral part of health services.

4203 Institute of Nutrition of Central America and Panama (1949-) R PR PH PN INCAP Member Governments—To develop the programme of the Institute, which provides advisory services to its member countries and carries out nutrition research and training.

4204 Nutrition advisory services, Zone IV (1956-) R—To assist the countries of the zone in the planning, implementation and evaluation of national food and nutrition programmes.

4207 Caribbean Food and Nutrition Institute (1963-) R PR PG: Research Corporation, USA; Rockefeller Foundation; United Kingdom Committee of Freedom From Hunger Campaign—To assist the Institute, which carries out training programmes in applied nutrition, undertakes field investigations on problems of community nutrition, and coordinates activities in food and nutrition in the countries of the Caribbean area where English is spoken.

4211 Research in protein-calorie malnutrition (1971-) R—To assess the socioeconomic factors and the relative importance of deficiencies of protein, calories and other nutrients in the etiology of malnutrition; and to plan practical approaches to the prevention and control of protein-calorie malnutrition in the Region.

4225 Graduate course in public health nutrition (1969-73) R—To develop a curriculum in public health nutrition, leading to a Master's degree, for graduate students at the School of Public Health of the University of Puerto Rico.

4230 Public health nutrition education and training (1969-) PR—To assist in strengthening training in nutrition at university level in countries of Latin America.

4233 Nutrition teaching in medical schools (1972-) R—To assist in developing the teaching of nutrition in schools of medicine and public health.

4238 Nutrition research (1971-74) PR PK—To assist with studies of protein-calorie malnutrition, nutritional anaemia, endemic goitre and hypovitaminosis A, and in the development and testing of low-cost sources of protein.

4242 Workshop on Fortification of Food with Iron, São Paulo (14-16 July 1972) PS—Twenty collaborating investigators considered the most effective ways of fortifying food with iron in order to improve iron balance in infants and women of child-bearing age in Central and South America.

4300 Mental health, interzone (1965-) PR—To assist mental health programmes in countries of the Region.

4312 Courses in community psychiatry (1971-76) PR—To assist in organizing, in certain countries, courses in basic psychiatry for general practitioners, as well as a programme of

continuing education, under the guidance of qualified psychiatrists, to follow the courses.

4313 Psychiatric nursing (1971-75) R—To assist in improving psychiatric nursing education and services.

4314 Epidemiological study on epilepsy (1972-75) R—To carry out epidemiological studies to ascertain the distribution of epilepsy, the magnitude of the problem, and the reasons for higher prevalence in some areas, so that services can be planned accordingly.

4315 Study Group on the Training of Psychiatrists, Bogotá (26-30 June 1972) R—To review training programmes in psychiatry in the Region and formulate recommendations on minimum standards for such programmes. There were 15 participants from 12 countries. Provided—two consultants, the cost of attendance of the participants, and the services of two staff members.

4318 Epidemiology of Alcoholism (1972-75) PG: National Institutes of Health, USA—To study the drinking patterns and prevalence of alcoholism in several Latin American cultures, and promote the establishment, in Latin American countries, of centres for the study of alcoholism.

4400 Dental health, interzone (1954-) PR—To promote the development of dental health, and particularly of dental public health, in the countries of the Region, and assist in training various types of dental personnel.

4407 Dental epidemiology (1964-) PR PG: Royal College of Surgeons, United Kingdom—To assist, together with national and international agencies, in conducting epidemiological studies and applied research on dental diseases; to cooperate in the development of regional centres for training in dental epidemiology, in the training of dentists in methods applicable to clinical trials and health surveys, and in the provision of manuals; and to promote programmes of continuing education in dental epidemiology.

4409 Fluoridation (1967-) PR PH—To promote the use of fluoridation for the prevention of dental caries in the Region by training engineers in fluoridation techniques, carrying out surveys and studies and assisting countries in planning and improving programmes for the fluoridation of water supplies, for salt fluoridation, or for topical application of fluorides, and in initiating fluoride production.

4410 Laboratories for control of dental products (1968-) PR PH—To assist in establishing regional laboratories or centres to cooperate with countries in improving the quality of materials used in dental treatment, controlling the quality of dental products, providing training for teachers and research workers in dental materials, and conducting applied research on dental materials.

4411 Human and material resources in dentistry (1967-) PR—To study the current position as regards human and material resources in dentistry available in Latin America; and to assist in formulating and implementing plans for the development of dental resources.

4500 Health aspects of radiation (1958-) R—To cooperate with countries of the Region in the measurement of radioactivity in air, water and food samples, in the formulation of radiation protection programmes and in the use of radioisotopes in medicine.

4507 Radiation protection (1964-) PR—To assist in the development of radiation protection programmes.

4509 Radiation surveillance (1963-) PR—To assist governments in the Region in organizing radiation surveillance programmes.

4618 Manganese poisoning (1964-) PG: Department of Health, Education and Welfare, USA; National Institute for Occupational Safety and Health, USA—To assist research on the mental and neurological syndrome produced by chronic inhalation of dust containing manganese.

4700 Food and drug control, interzone (1959-) PR—To provide technical advice to the national services responsible for the health aspects of production and control of foods, drugs and biologicals, both locally manufactured and imported; and to assist countries in improving national control services.

4703 Food reference laboratory, Zone III (1964-) R PR—To develop the food analysis laboratory that has been set up at the Institute of Nutrition of Central America and Panama to act as a reference laboratory for the countries of the zone.

4708 Food hygiene training centre (1971-74) R—To assist the centre for training in food hygiene that has been set up in the School of Public Health, Caracas, in cooperation with the Government of Venezuela, to provide advanced instruction in the basic principles of food technology for professionals, and basic courses in food hygiene, inspection, and control techniques for inspectors.

4716 Training in analysis of food and drugs (1972-) R—To assist in the training of drug analysts.

4800 Medical care services, interzone (1961-) PR; **4801 Zone I (1970-) R**; **4803 Zone III (1962-) PR**; **4804 Zone IV (1963-) PR**—To assist countries in the improvement of medical care services, particularly as regards coordination of services and hospital administration, and in the solution of general medical care problems.

4813 Hospital planning and administration (1968-) R PR—To assist countries in improving hospital and medical care facilities, in establishing maintenance programmes, and in planning new facilities to meet the increasing demand for services.

4815 Training for medical care and hospital administration (1967-) PR—To develop the programmes of training in administration of medical care and hospital services at schools of public health, schools of medicine and other institutions in Latin America.

4816 Progressive patient care (1967-) PH—To assist in setting up, in Latin American university hospitals, intensive care units that will also serve for demonstration and teaching purposes.

4826 Improvement of hospital and medical care administration libraries (1971-74) PR PH—To assist the libraries of schools of public health in Latin America in improving and increasing the availability of their reference material on medical care and hospital administration.

4900 Health and population dynamics, interzone (1968-) PR PK PG: USAID—To assist governments in the development of activities relating to the health aspects of population dynamics.

4901 Health and population dynamics, Zone I (1968-) R PK; **4902 Zone II (1972-) PR**; **4903 Zone III (1972-) PR**; **4906 Zone VI (1972-) PR PK**—To assist countries in developing family planning programmes and integrating them into the health services.

4909 Education and training in health and population dynamics (1971-) PK PG: USAID—To assist in the training of personnel in health and population dynamics to meet the needs of the programmes in this field.

4910 Research and evaluation in health and population dynamics (1971-) PK—To conduct research on the relationship between health and population dynamics and to develop methodology for evaluating maternal and child health and family planning programmes.

4912 Seminar on Nursing and Midwifery Aspects of Maternal and Child Health and Family Planning, Washington, D.C. (23-27 Oct. 1972) PK—Thirty-seven nurses, midwives and nurse/midwives from 23 countries of Latin America and the Caribbean area attended the seminar, the purpose of which was to acquaint them with recent trends in maternal and child health care and family planning, and to promote the application of these developments in the participants' countries for the improvement of maternal, child and family health. The Johns Hopkins University School of Hygiene and Public Health collaborated in organizing the seminar, which received financial support from the Organization.

5000 Rehabilitation, interzone (1962-) R PR—To advise countries of the Region on problems of medical rehabilitation, and assist in the development of rehabilitation services and in the training of personnel.

5100 Chronic diseases (1967-) PR—To assist Latin American countries on problems of chronic diseases and on the planning of projects for prevention and control.

5108 Survey on smoking patterns in Latin America (1970-) PR PG: American Cancer Society—To conduct a survey in eight Latin American cities to determine the prevalence of smoking, the social, cultural and demographic characteristics of smokers, community attitudes towards smoking, the probable influence of cigarette smoking as a cause of illness, and the differential mortality rates.

6000 Medical education: Textbooks and teaching materials (1967-) PK PT—To provide textbooks at a lower cost to medical students; to develop a cooperative arrangement with medical schools in order to ensure the selection of textbooks of high scientific and pedagogical quality; and to establish a revolving fund to ensure continuity of the programme.

6100 Human resources development in public health, interzone (1963-) R PR—To coordinate country projects relating to training of public health personnel, review the principles and standards applicable to training in public health schools and the structure and functioning of such schools, develop a programme of short intensive courses in public health, and provide assistance to individual schools.

6101 Human resources development in public health, Caribbean area (1969-) R PR PH—To collaborate in programmes for the development of human resources for health work in countries of the Caribbean area.

6200 Education in health sciences, interzone (1953-) PR PG: National Institutes of Health, USA—To assist the medical schools in Latin America in the solution of problems, in developing their programmes and in improving teaching methods; and to collaborate in the organization of a regional system for the collection of information relative to the training of health personnel, and in the development of studies of human resources.

AMRO (*continued*)

6203 Medical education, Zone III (1971-) PR; 6204 Zone IV (1966-) PR; 6206 Zone VI (1971-) PR—To assist medical schools in improving programmes and methods of medical education.

6208 Teaching of statistics in medical schools (1972-) PR—To provide short courses on various aspects of statistics for faculty members of certain medical schools.

6214 Faculty training for medical schools (1969-72) PG: Kellogg Foundation—To improve the standards of medical education by the award of fellowships to teachers from countries of the Region for studies in pedagogic techniques at the School of Medicine of the University of Antioquia in Medellín, Colombia, and through arrangements for the supply of teaching and laboratory equipment to the fellows on their return to their own institutions. Provided—fellowships (under country programmes), and supplies and equipment.

A study was made of the postgraduate training programmes at the School of Medicine of the University of Antioquia in the light of the participation of teachers receiving fellowships under country projects. Teaching and laboratory equipment was supplied in answer to requests from fellows in Argentina, Guatemala, Honduras, Peru (two requests) and Venezuela. Supplies and equipment were also provided to the University of Concepción, Chile, under this project.

6216 Teaching of preventive and social medicine (1965-) PR PG: Milbank Memorial Fund—To make an assessment of the situation in respect of medical education and of the teaching of preventive and social medicine in Latin American medical schools.

6221 Regional Library of Medicine (1970-) R PR PH PK PG: Government of Brazil; Commonwealth Fund; National Library of Medicine, USA—To assist the Library of Medicine which was set up at the Paulista School of Medicine, São Paulo, Brazil, with the help of the Organization in 1967 (under project Brazil 6221) and which provides library support for biomedical education, research and practice in Latin America, and trains biomedical librarians at advanced level.

6223 Teaching of behavioural sciences (1972-) UNDP—To assist in improving teaching and research in the behavioural sciences as applied to the solution of medical problems. Activities include the promotion of integrated programmes of behavioural and social sciences and clinical subjects in certain schools of health sciences, the provision of postgraduate courses for training teachers in behavioural sciences, and research on medical problems where psychosocial factors are involved.

6228 Medical education, Caribbean area (1971-74) R—To assist the School of Medicine of the University of the West Indies in strengthening its administration, improving teaching methods and developing postgraduate training programmes.

6233 Latin American centre of educational technology for health (1972-) PR—To establish, in the Federal University of Rio de Janeiro, a centre for research on and development of educational methodology applied to the health field.

6300 Nursing education, interzone (1958-) R; 6301 Zone I (1963-) PR PK; 6304 Zone IV (1972-) R—To assist

countries in strengthening nursing education and training programmes.

6312 Seminars on nursing education, Zone I (1971-) PR—To organize seminars for establishing and applying criteria and standards for training nursing and obstetrical personnel in the countries of the Caribbean area where English is spoken.

6315 Nursing education: Textbooks (1971-) PT—To improve nursing education in nursing schools of Latin America by helping them to provide textbooks at a cost within reach of their students and to revise nursing curricula.

6317 Seminars on nursing education (1971-) R—To establish minimum standards for the development of nursing education programmes at various levels in the countries of Middle and South America.

6319 Training of nursing auxiliaries (1970-74) R—To make a study of the courses for training nursing auxiliaries in the countries of Middle and South America and of the work carried out by the auxiliaries; to stimulate trials of new techniques for training, and assist with programmes for training instructors.

6400 Sanitary engineering education, interzone (1964-) PR—To assist countries of the Region in developing their institutions for the training of sanitary engineers and in revising curricula.

6401 Sanitary engineering education, Zone I (1972-) R (University of the West Indies)—To develop sanitary engineering and environmental health education in the countries of the zone and assist the School of Public Health of the University of the West Indies in strengthening its teaching facilities.

6500 Veterinary medical education (1966-) R—To strengthen the teaching of veterinary medicine, particularly as regards the preventive medicine and public health aspects.

6507 Seminars on veterinary medical education (1972-) PR—To develop a scheme for improving teaching methods with a view to speeding up the training of veterinarians and animal health assistants.

6600 Dental education, interzone (1963-) PR—To cooperate with university authorities of countries of the Region in improving teaching in schools of dentistry.

6608 Training of auxiliary dental personnel (1965-) PR—To promote the training of various kinds of dental auxiliary personnel and their use for work for which a fully qualified dentist is not necessary, so as to permit the extension of dental services to the population and reduce their cost.

6700 Biostatistical education (1952-) UNDP—To improve vital and health statistics in the countries of the Region by training technical and professional personnel in specialized centres.

6707 Latin American Centre for Classification of Diseases (1955-) R—To study problems of medical certification of causes of death; to give training on classification of causes of death in accordance with the International Classification of Diseases; and to assist in revising the Classification.

6708 Training programme in hospital statistics (1961-) PR—To promote the development of courses in medical records and hospital statistics.

SOUTH-EAST ASIA REGION

Bangladesh

0001 Malaria eradication programme (1972-) R (United Nations Relief Operations in Dacca).

0003 Smallpox eradication (1972-75) R—To develop the eradication programme.

0006 Strengthening of epidemiological services (1972-) R UNDP—To implement measures for the epidemiological surveillance and control of infectious diseases of public health importance.

0009 Organization of health services and planning (1972-) R—To set up an organization for health planning in the Ministry of Health, train personnel in health planning and develop a health information system; to plan integrated rural health services including a referral system; and to plan health and manpower studies with the aim of improving the delivery of medical care, especially in rural areas.

0011 Pharmaceutical quality control (1972-) R—To reorganize and develop the medical stores and supply services.

0013 Nursing advisory services and training (1972-) R—To assess the nursing-midwifery component of the health services, particularly in the rural areas, and to develop nursing education and services.

0015 Venereal disease and treponematosis control (1972-) R—To reorganize the control programme.

0016 Blindness survey (1972-) R—To carry out a survey of blindness and draw up a plan for future work in this field.

0018 Strengthening of rural health services (1972-) R—To establish and strengthen health programmes for rural areas, including programmes for training professional and auxiliary health workers.

0019 Public health education (1972-) R—To strengthen the Department of Social and Preventive Medicine of the Medical College, Dacca, and institute a diploma of public health course at the Institute of Public Health.

Burma

0006.2 Maternal and child health (1969-73) R UNICEF—To strengthen the departments of paediatrics and obstetrics of major hospitals and improve the teaching in these subjects, especially as regards the preventive aspects; and to improve and expand maternal and child health activities as part of the general health services.

0017 Leprosy control (1960-74) R VL UNICEF—To intensify the leprosy control programme, extend it to cover all endemic areas, and train personnel for the purpose.

0022 Vital and health statistics (1955-) R—To develop the system of reporting and recording health statistical data, improve their processing, and train staff.

0028 Institute of Medicine I and School of Preventive and Tropical Medicine, Rangoon (1955-59; 1961; 1963; 1966-) UNDP—To improve the teaching of undergraduates and promote research and postgraduate study in departments of the Institute of Medicine I, and to develop the diploma course at the School of Preventive and Tropical Medicine.

0031 Antimalaria operations (1957-66; 1968-) R—To undertake antimalaria operations throughout the country in progressive stages, with the ultimate goal of eradicating the disease.

0044.2 Strengthening of health services (epidemiology) (1968-77) UNDP—To strengthen the Epidemiological Unit in the Directorate of Health Services; obtain, through epidemiological surveillance, information on trends in important communicable diseases in order to plan control measures; and develop public health laboratory services to support this work.

0056.2 Nursing advisory services (1959-66; 1969-) R—To develop nursing and midwifery education and services.

0065 Tuberculosis control (1964-74) UNDP UNICEF—To develop community-oriented integrated tuberculosis control services in all divisions of the country.

0066 Health education (1966; 1968; 1971-76) R—To develop health education services and to give training in health education to teachers and those holding key posts in the school organization and in the general health services.

0069 Trachoma control (1966-67; 1970-) R UNICEF—To continue the control programme.

0074 Strengthening of laboratory services (1967-77) R UNICEF—To strengthen laboratory services and promote their development at central and peripheral levels. The project is coordinated with project Burma 0044.2 (see above).

0077 Burma Pharmaceutical Industry (production of biologicals) (1966; 1968-77) R UNICEF—To assist the Biological Division of the Burma Pharmaceutical Industry, Rangoon, in modernizing methods of production and assay of bacterial and viral vaccines and antisera preparations, and in developing new vaccines.

0078 Plague control (1966; 1970-74) R—To identify the factors responsible for the persistence of foci of plague and train personnel in the epidemiology and control of the disease.

0079 Medical education (1964-) R—To improve undergraduate and postgraduate medical education, train teaching staff, develop curricula in keeping with modern concepts, and initiate and promote research at the Institutes of Medicine.

0080 Smallpox eradication (including smallpox vaccine production) (1967-71) R UNICEF—To carry out the maintenance phase of the smallpox eradication programme and establish a surveillance system. Provided—a medical officer for one week's visit, two short-term consultants, and supplies and equipment.

From 1967 to 1971, continuing the assistance already provided under project SEARO 0030 (Smallpox eradication and epidemiological advisory team) since 1962, supplies and equipment for smallpox vaccination were provided, including freeze-dried

Burma (continued)

vaccine and, in 1967, 10 motor-cycles, donated by Japan to WHO (for use by vaccination teams). A medical officer attached to the intercountry advisory team reviewed the programme in August 1969; methods of concurrent assessment were demonstrated, and recommendations were made for the use of bifurcated needles instead of ped-o-jets for vaccination. In 1970 the two consultants were members of a joint Burma/WHO assessment team, which recognized the success of attack measures, and recommended continuation of the vaccination programme until a surveillance system is established, in view of the proximity of endemic areas in the Region. In 1971 a smallpox diagnostic laboratory was set up. Further assistance will be provided to the laboratory as necessary, and with testing of locally-produced freeze-dried vaccine, under project SEARO 0030.

0086 Goitre control (1971-72) R UNICEF—A consultant assisted in devising a methodology for the evaluation of the goitre control programme and helped the Burma Medical Research Institute to plan research in nutrition as applied to goitre control. Supplies of iodized oil were provided for use in the programme and a fellowship was awarded.

0087 Filariasis control (1969-77) R

0088 Rehabilitation of the handicapped (1969-77) R—To expand medical rehabilitation services at the central and peripheral levels and to improve workshop facilities for the manufacture of orthopaedic and prosthetic appliances.

0089 Institute of Technology, Rangoon (1969-73) UNDP—To teach sanitary engineering to undergraduate and graduate civil engineering students.

0090 Dental health services (1971-) R—To improve dental health and dental education.

0091 Radiation health (1970-75) R—To strengthen radiation protection services in the health institutions, first developing film-badge monitoring services in Rangoon and gradually expanding the coverage to peripheral hospitals; and to train staff for the purpose.

0092 Quality control of drugs (1970-) R—To formulate new legislation and develop laboratory competence in the quality control of pharmaceutical and biological preparations.

0093 Nutrition services (1972-) R—To strengthen the nutrition work of the health services by organizing in-service orientation courses for medical staff and providing key personnel with specialized training.

0094 Strengthening of health services (1969-) R UNICEF—To strengthen the health services, placing emphasis on the development of comprehensive services for health care, and to train health personnel, especially auxiliaries, for basic health services.

0095 Burma Medical Research Institute (1972-) R—To strengthen units of the Institute.

0097 Maintenance and repair workshops for health equipment (1971-75) R UNICEF—To establish workshops and train staff in the maintenance and repair of equipment used in health institutions.

0098 Virus diseases (1972-) R—To make epidemiological studies of virus diseases, carry out control measures, and train the necessary staff.

0100 Education and training of health manpower (1972-) UNDP—To strengthen undergraduate and postgraduate education in the three medical institutes, as well as the training of nurses, midwives and health visitors and of various categories of auxiliary health personnel; and to expand and strengthen the rural health demonstration area, Hlegu, which will be used for the training of all members of the health team.

0101 Clinical pathology, Institute of Medicine, Mandalay (1971-) UNDP—To improve the standards and broaden the scope of the laboratory services provided by the Institute's Department of Clinical Pathology.

India

0053 Tuberculosis Chemotherapy Centre, Madras (1955-75) R UNDP—To undertake controlled clinical trials to find simple, effective and inexpensive methods of tuberculosis control through domiciliary chemotherapy of ambulant patients, and to carry out related research.

0081 Leprosy control (national programme) (1961-74) R UNICEF—To develop a leprosy control programme and train the necessary staff; and to provide technical direction for a control project supported by the Danish "Save the Children" Organization.

0103 National tuberculosis programme (1956-74) R UNDP UNICEF—To develop a national tuberculosis programme through implementing control programmes in each district in accordance with the results obtained in model control programmes, epidemiological findings and operational research; train health workers for the district tuberculosis programmes; and develop methods and procedures for assessment of the programme.

0108 Health education: Assistance to states (1971-) UNDP—To set up and develop state health education bureaux, and to coordinate the health education activities of the general health services with those of the family planning programme or integrate them into the programme.

0111 Medical education (1958-61; 1965-74) R—To improve teaching and research in medical colleges.

0114 Paediatric education (1958-77) R UNICEF; **0114.7 Rajasthan (1971-77)** R UNICEF; **0114.8 New Delhi (1971-77)** R UNICEF; **0114.9 Gujarat (1972-77)** R UNICEF—To expand and improve undergraduate and postgraduate teaching of paediatrics in certain medical colleges and develop courses for various categories of personnel in paediatric departments.

0121 Indian Council of Medical Research (statistics) (1962-75) R—To strengthen the Council's statistical unit and train staff for medical research.

0136.1 Postbasic nursing education, Uttar Pradesh (1962; 1972-74) R; **0136.2 Gujarat (1963-74)** R; **0136.3 Punjab (1964-74)** R; **0136.5 Madras (1964-73)** R; **0136.7 New Delhi (1969-74)** R; **0136.8 Bombay (1970-74)** R—To expand postbasic nursing education, with initial emphasis on postbasic degree programmes offering professional specialization in teaching, administration, public health or one of the clinical specialties.

0153 Malaria eradication programme (1958-) R (USAID)

0174 Production of freeze-dried smallpox vaccine (1964-) R UNICEF—To increase the production of freeze-dried smallpox vaccine.

0176 Central Public Health Engineering Research Institute, Nagpur (1961-77) R—To develop the Institute as a major research centre for environmental sanitation problems, co-ordinate research programmes and train research workers.

0181 Applied nutrition programme (1964-74) R UNICEF (FAO)—To expand and improve the health component of the applied nutrition programme assisted by FAO, UNICEF and WHO.

0182 Strengthening of health services (epidemiology) (1963-74) UNDP—To establish or improve health intelligence units in state health directorates; to train staff in epidemiology, health statistics, microbiology and communicable disease control; and to develop the National Institute of Communicable Diseases, Delhi.

0185.2 and 3 Strengthening of health services, Punjab and Haryana (1967-74) R UNICEF—To strengthen the health services at state, district and local levels, giving particular attention to the provision of training programmes for health staff and supervision of auxiliary staff by professional staff, and to operational studies.

0187 Training of radiological technicians (1967-74) R—To raise the standard of training of radiological technicians at the Postgraduate Institute of Medical Education and Research, Chandigarh.

0188 Strengthening of laboratory services (1965-) R—To strengthen health laboratory services and improve the training of laboratory technicians.

0190 Training in health education (1968-77) R—To establish and develop three postgraduate health education training centres with rural and urban field practice areas.

0192 Radiation Medicine Centre, Bombay (1963; 1967-77) R—To strengthen the Centre.

0194 Medical rehabilitation (1963-64; 1967; 1969-) R UNICEF—To expand medical rehabilitation services and establish training schools in the various disciplines.

0197 Occupational health (1964; 1970-) R—To conduct courses in occupational health and to initiate research projects in specific industries.

0199 School for training of technicians (1967-77) UNDP—To train technicians in the installation, maintenance and repair of electrical and mechanical equipment used in health institutions.

0208 Improvement of dental education (1966-77) UNDP

0210 Public health engineering education (1967-70; 1972-) UNDP—To train sanitary engineers and develop advanced courses in the design of community water supply programmes.

0212.1 Nursing administration, Chandigarh (1968-73) R;

0212.2 Gujarat (1968-73) R—To develop nursing administration in teaching hospitals and promote in-service training and coordination of nursing services and nursing education.

0214 Virological techniques (1968-69; 1971-77) R—To develop laboratory capacity for the diagnosis and surveillance of virus diseases and establish competence in the production and testing of live poliomyelitis vaccine.

0218 National Institute of Health Administration and Education (1965-74) R UNICEF—To conduct studies in district health administration at Rohtak (Haryana) as a prelude to the promotion and planning of comprehensive health care services at

the district level; to formulate research and teaching programmes pertaining to health administration, and to undertake teaching programmes, studies and research in the field of hospital administration.

0221 Seminars and workshops on medical education (1965-) R—To strengthen medical teaching.

0222 Drug laboratory techniques and biological standardization (1967-75) R—To develop the services for the quality control of pharmaceutical and biological preparations and train staff.

0226 Water pollution (1969; 1971-) R—To provide technical advice on organizational and other matters related to the abatement and control of water pollution.

0227 Rural water supplies (Nov. 1971-Jan. 1972) R—Two consultants assisted with preparations for a meeting of officials concerned with the planning and execution of rural water supply schemes; the meeting, however, was postponed owing to the national emergency. One of the consultants helped to collect data on and to assess the progress of the rural water supply programmes in various states.

0233 Smallpox eradication (1967-75) R—To develop the eradication programme, carry out periodic assessments, and train staff.

0234 Training of medical teachers (1968; 1971-) UNDP—To provide further training to medical teachers.

0238 Cancer control pilot project, Tamil Nadu (1968-) R VR—To develop a pilot project for the early diagnosis and control of oropharyngeal and cervical cancer and set up a training centre at Kancheepuram.

0244 Training in veterinary public health (1967-) R—To initiate and support studies of zoonoses at the National Institute of Communicable Diseases, Delhi, the Haffkine Institute, Bombay, the Indian Veterinary Research Institute, Mukteswar-Kumaon, and other institutions, public health laboratories and medical colleges.

0250 Integration of maternal and child health services into the general health services (1967-68; 1970-) R—To integrate maternal and child health services, including family planning, into the general health services in certain states.

0251 Groundwater training course (1970-74) R—To train staff in groundwater development and utilization for community water supplies.

0255 Strengthening of health statistical services (1970; 1972-) R—To strengthen health intelligence units in state health departments and train statistical staff.

0257 Physical therapy school, Baroda (1968-) R—To train physical therapists to degree standard at the school in the S.S.G. Hospital, Baroda.

0259 National Institute of Communicable Diseases, Delhi (1971-) R—To strengthen the faculty of the Institute in order to improve the field training of epidemiologists.

0267 Nutrition training (1970-74) R—To support the National Institute of Nutrition, Hyderabad.

0268 Village water supply (1971-74) R UNICEF—To plan and coordinate the development of community water supplies in rural areas, including the well-drilling programme in areas where hard rocks present special problems and in those where water is scarce; and to train professional and drilling staff.

India (continued)

0269.1 and 3 Nursing in clinical specialties, New Delhi (1972-) R; **0269.2 Rajasthan (1972-) R**—To improve clinical practice in certain nursing specialties.

0270 Control of air pollution (1971-) R—To study the air pollution problems connected with industrial development and promote a control programme.

0275 Strengthening of the teaching of human reproduction, family planning and population dynamics in medical colleges (1971-) UNFPA—To strengthen teaching and research in the relevant departments of medical colleges.

0276 Strengthening of family planning aspects of nursing administration (1972-) UNFPA—To strengthen the nursing and midwifery components of health care during the maternity cycle.

0277 Strengthening of the teaching of human reproduction, family planning and population dynamics in nursing and midwifery education (1972-) UNFPA—To improve the maternal and child health and family planning components of the training of auxiliary nurse/midwives; to strengthen the domiciliary midwifery and public health nursing experience of nursing students in hospital schools of nursing; and to improve the teaching of human reproduction, family planning and population dynamics in teaching institutions for nursing personnel.

0279 Medical toxicology unit (1972-) R—To undertake studies of the effect of air pollutants and organochlorine pesticides in man.

Indonesia

0032 Malaria eradication programme (1955-) R—To reduce malaria endemicity to the lowest possible level, with the ultimate goal of malaria eradication.

0050 Tuberculosis control (1961-74) R UNICEF—To integrate BCG vaccination without prior tuberculin testing into the work of the maternal and child health clinics and regency polyclinics; to train health staff in case-finding by direct sputum smear examination; and to provide ambulatory treatment to tuberculosis patients.

0060 Laboratory services (1967-77) R UNICEF—To strengthen health laboratory services.

0061 Training in sanitary engineering (1968-) R—To train sanitary engineers at the Institute of Technology, Bandung.

0062 Medical education (1964-) R—To develop the teaching programmes of the medical faculties in keeping with national needs and the progress of medical science.

0066 Improvement of urban water supplies, Province of West Irian (Jan.-April 1972) WI—A consultant carried out feasibility studies for the improvement of urban water supplies, advised on the design of water supply systems and assisted in developing a phased programme in this field.

0069 Training of X-ray and electromedical technicians (1966-) R—To train technicians and radiographers in the use, maintenance and repair of electromedical equipment.

0071 National community water supply and sanitation (1969-) R—To plan community water supply, sewerage and storm-water drainage systems, water pollution control and general sanitation work; and to train staff.

0072 Establishment of health centres, Province of West Irian (1970; 1972-) WI—To develop integrated health services in

accordance with the available facilities and resources. Coordination of other health projects in West Irian is effected under this project.

0074 Nursing and midwifery education (1967; 1969-76) R—To strengthen and develop nursing and midwifery education.

0076 Malaria control, Province of West Irian (1970-) WI

0079 Dental health (1968-) R UNDP—To develop the programmes for training dental personnel at professional and auxiliary levels, extend dental health services within the framework of comprehensive health services, and explore the feasibility of establishing water fluoridation schemes.

0081 Smallpox eradication (1967-) R

0083 Vaccine and sera production (1968-74) UNDP—To improve methods of producing bacterial and viral vaccines, antitoxins and toxoids, and develop testing facilities.

0084 Nursing education and training, Province of West Irian (1970-) WI—To strengthen and develop nursing and midwifery education and services.

0086 Strengthening of national health services (1969-) R UNICEF—To plan, coordinate and integrate health services and programmes, standardize and intensify the training programmes for health personnel, and promote studies of public health practice intended to lead to the optimum delivery of health care.

0091 Strengthening of epidemiological services (1969-) R—To develop epidemiological units at the central and intermediate levels and train the necessary staff.

0097 Postgraduate education in public health (1972-77) R—To develop the teaching programme of the School of Public Health, University of Indonesia.

0098 National Institute of Medical Research (1972-75) R—To design, organize and analyse biomedical studies.

0099 Plague epidemiology (1969-) R—To assess factors responsible for the persistence of plague and study any new foci of the disease.

0100 Veterinary public health (1971-) R—To study the main zoonoses prevalent in the country and train veterinary public health officers.

0107 Establishment of cytology services and training as part of the national family planning programme (1970-74) UNFPA—To establish laboratory services for cytology, initially at each of the principal medical schools, as part of the national family planning programme.

0113 Family health services (1970-) UNFPA—To plan, organize and operate maternal and child health and family planning activities as a regular function of the health services directed towards families.

0114 Strengthening of the teaching of human reproduction, family planning and population dynamics in medical schools (1971-74) UNFPA—To strengthen teaching and promote research in the relevant departments of medical schools.

0116 Radiation health (1972) R—Supplies and equipment were provided to assist the development of a film badge monitoring service.

0119 Family health : Manpower and resources (1971-) UNFPA—To take a census of health manpower, make an inventory of health and training facilities, and develop a records system.

0120 Health education (behavioural studies) (1971-) UNFPA—To design and initiate behavioural studies and, following analysis of the results, to plan health education measures required for achieving the objective of family health services within the context of various WHO-assisted programmes.

0122 Health education in family planning teaching programme (Aug.-Dec. 1971) UNFPA—A consultant assisted in reviewing the teaching of health education to health personnel being trained for the family health programme and helped with a national working group that prepared plans and a curriculum. Since January 1972 the work of the project has been continued under project Indonesia 0120.

0125 Applied nutrition programme (1971-) R—To plan nutrition surveys to supply baseline data for the applied nutrition programme.

Maldives

0005 Public health administration (1969-) R—To develop comprehensive health services, strengthen the medical care services, and train health personnel.

0007 Water supply and sanitation (1971-76) R—To develop water supply and sewage disposal systems for Male and an environmental sanitation programme; and to train staff.

0009 Training of auxiliary health personnel (1971-) UNDP—To establish a school for the training of auxiliary health personnel.

0010 Malaria control (1972-) R—To control malaria progressively throughout the archipelago with the aim of eventually eradicating the disease and preventing its re-establishment; and to integrate antimalaria activities into the work of the general health services.

Mongolia

0001 Strengthening of health services (epidemiology) (1963-72) R—To carry out epidemiological surveys of the prevailing communicable diseases in order to plan practical control measures; to advise all branches of the medical and health services on the use of epidemiological methods, and to train personnel.

0002 Public health laboratory services (1964-) UNDP UNICEF—To develop the health laboratory services and train personnel in health laboratory work.

0003 Tuberculosis control (1963-72) UNDP—To organize a comprehensive tuberculosis control programme throughout the country.

0004 Maternal and child health services (1965-80) UNDP—To develop the maternal and child health services and establish referral facilities.

0005 Environmental health (community water supply) (1966-) UNDP—To develop water supplies and sanitation, particularly in the rural areas.

0006 Medical education (1970-) R—To develop and improve medical education.

0007 Health statistics (1967-75) R—To develop health statistical services and train personnel in health statistics procedures.

0008 Nursing services and education (1966; 1968-77) R—To develop schools of nursing, strengthen the training programmes for nursing personnel, and improve nursing services.

0010 Cardiovascular diseases (1967; 1969-) R—To study the epidemiology of certain cardiovascular conditions, particularly rheumatic, hypertensive and ischaemic heart disease, in order to determine further action.

0011 Cancer (1968-) R—To study the epidemiology of cancer, improve radiotherapy of the disease, and train personnel.

0012 Strengthening of radiological services (1968-69; 1971-76) R—To train engineering technicians to undertake the repair and maintenance of electromedical equipment; and to promote radiation protection practices in health institutions.

0013 Brucella vaccine production (1970; 1972-) UNDP—To produce freeze-dried *Brucella* vaccine and establish laboratory facilities for its testing.

0014 Health education (1970-80) R—To plan and implement a health education programme.

0015 Dental health services (1970; 1972-) R—To strengthen dental health services, particularly the paediatric stomatology services, train dental health personnel, and study the feasibility of a fluoridation programme.

0018 Epidemiological services and surveillance (1972-) R—To develop the epidemiological surveillance of diseases of public health importance.

Nepal

0001 Malaria eradication programme (1954-) R (USAID)

0002 Nursing education and services (1954-74) UNDP UNICEF—To coordinate nursing activities; set up a basic nursing school; organize courses for assistant nurse/midwives; upgrade nursing services in Bir Hospital; improve clinical facilities, and develop public health nursing services that will provide teaching practice for nursing and assistant nurse/midwife students.

0009 Smallpox eradication (1962-63; 1966-75) R VS UNICEF

0010 Health laboratory services (1967-79) R UNICEF—To develop health laboratory services in order to improve diagnostic services and provide support for an epidemiological unit; and to train personnel.

0013 Leprosy control (1967-) R—To develop the leprosy control programme and train the necessary personnel.

0016 Tuberculosis control (1965-) R UNICEF—To develop a tuberculosis control programme within the basic health services and train personnel in control methods and techniques.

0019 Health education (1967-77) R—To plan health education in the basic health services and specialized projects, and to strengthen health education in schools and teacher-training institutions.

0021 Development of health services (1968; 1970-) R—To strengthen the development of the basic health services in conformity with the Government's development plans, placing emphasis on the training of all categories of health workers, with the object of eventually establishing an integrated comprehensive health care service; to conduct health surveys, health manpower surveys and relevant studies; and to coordinate associated projects operating in the country.

Nepal (continued)

0025 Water supply and sewerage for Greater Kathmandu and Bhaktapur (1969-) UNDP—To improve water supply and sewerage in Greater Kathmandu and Bhaktapur.

0026 Strengthening of epidemiological services (Feb.-April 1972) R—A consultant assisted in planning and operating epidemiological services in respect of various diseases.

0029 National community water supply and sanitation (1971-) R UNICEF—To plan, organize and implement a national environmental health programme, including community water supply and waste disposal, and to strengthen the Sanitary Engineering Bureau of the Department of Irrigation and Water Supply of the Ministry of Irrigation and Power.

0032 Medical stores management (1972-) R—To develop medical stores and supply services.

0033 Prevention of rabies (1972-) R—To improve the laboratory diagnosis of rabies and the production and control of rabies vaccine.

0034 National Workshop on Integrated Maternal and Child Health/Family Planning Services (6-10 Dec. 1971) UNFPA—To review the present stage of development of the national maternal and child health/family planning services. Two members of the regional team on family health (project SEARO 0192) assisted in conducting the Workshop, which had 25 participants.

Sri Lanka

0026.2 Leprosy control (1967-73) R—To assess the leprosy problem, develop an integrated control programme and train staff.

0045 Health statistics (1957-61; 1964-73) UNDP—To establish an information system geared to the requirements of national health planning and to monitoring the performance of the health services, improve the processing of data on health manpower, and train staff.

0047 Medical education (1959; 1963-) R—To develop undergraduate and postgraduate teaching programmes and provide training for teachers at the two faculties of medicine.

0053 Nursing advisory services (1960-67; 1969-74) R—To develop nursing and midwifery education and services.

0056 Filariasis control (1959; 1961; 1963; 1965-) UNDP

0058 Malaria eradication programme (1960-) R

0063.2 Medical rehabilitation (1968-70; 1972-) R—To improve the rehabilitation services and train the necessary staff.

0064 Community water supply and sanitation (1963-78) R UNICEF—To develop programmes of water supply, sewage disposal, storm-water drainage and general sanitation, and to train personnel.

0066.3 Strengthening of laboratory services (1966-77) R—To develop specialized diagnostic and reference services in support of communicable disease prevention and control, and to train staff.

0072 Development of health education (1966-67; 1969-75) R—To strengthen health education services, including health education in schools, and evaluate activities; and to strengthen health education teaching in medical colleges, teacher-training institutions and other training centres.

0075 Tuberculosis control (1966-73) R UNICEF—To carry out a community-oriented tuberculosis control programme in all provinces.

0077 Quality control of biological and pharmaceutical products (1966-67; 1971-) R—To strengthen the quality control of pharmaceutical and biological preparations and to train staff.

0078 Strengthening of epidemiological services (1967; 1970-76) R—To strengthen the epidemiological services, including surveillance services, and train personnel.

0082 Occupational health and industrial hygiene (1968-) R—To control health hazards in industry.

0083 Port health services (1969-70; 1972-75) R—To strengthen port health services.

0084 Maternal and child health services (1968-71) R—To improve the preventive and curative maternal and child health and family health services, and to provide courses on maternal and child health for nursing and medical personnel. The work of this project is being continued under project Sri Lanka 0105.

0085 Public health nutrition (1969-75) R—To carry out a pilot project for the control of nutritional anaemia.

0086 Public water supply, drainage and sewerage for the south-west coastal area (1967-72) UNDP—In 1972 the master plan, including feasibility and management studies, was finalized, and personnel were trained.¹

0087 Dental health (1970-75) R—To develop training programmes for dental health personnel and expand dental health services as part of the general health services.

0092 National health planning (1970-75) R—To establish and strengthen a national health planning unit in the Ministry of Health and train health personnel in health planning.

0093 Veterinary public health services (zoonoses control) (1972-) R—To develop zoonoses control services.

0094 Strengthening of electromedical division (1972-) R—To train technicians for the repair of electromedical equipment and improve workshops undertaking the maintenance and repair of X-ray and other electrical and electronic equipment used in health institutions.

0099 Assessment and strengthening of health education in family health (1971) UNFPA—Three consultants assisted in evaluating the health education programmes and in strengthening health education services related to family health. The project was merged with project Sri Lanka 0104 at the beginning of 1972.

0101 Health manpower study (1971-73) UNFPA—To make a study of the work of Ministry of Health staff providing health care to rural communities as part of family health services; and to carry out a national study of health manpower.

0102 Training of anaesthesiologists (1972-75) R—To establish a national anaesthesiology training centre.

0103 Vector control (1972-) R—To carry out studies of arthropod vectors of diseases, and control measures, including larviciding, environmental sanitation and health education; and to control insect nuisances in areas important for tourism.

¹ For work done under this project between 1967 and 1971, see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, para. 17.57.

0104 Health education in family health (1972-81) UNFPA—To strengthen health education in the family health programme.

0105 Family health (1971-76) UNFPA—To promote family health as an integral part of the general health services.

0106 Strengthening of nursing and midwifery education (1972-74) UNFPA—To strengthen the nursing and midwifery education provided in the eight basic schools of nursing, the Mulleriyawa affiliation school, and the postbasic school of nursing in Colombo, with emphasis on public health, midwifery and child care.

Thailand

0002.2 Strengthening of health services (integration of specialized programmes) (1964-73) R UNDP UNICEF—To promote the integration of specialized communicable disease control programmes into the general health services and develop the rural health services.

0037 Vital and health statistics (1957-60; 1968-69; 1971-75) R—To develop a coordinated health statistics system and to train the staff required for this purpose and for the development of medical records offices.

0057 Faculty of Tropical Medicine (1959; 1961-64; 1967-73) R—To strengthen the Faculty of Tropical Medicine of Mahidol University, Bangkok.

0059 Epidemiology (1966-) R UNDP—To organize and strengthen a national epidemiological service (including surveillance activities), undertake studies of specific health problems and train personnel.

0065 Malaria eradication programme (1962-) R

0066 Food control administration (1964; 1971-76) R—To establish a national food control administration in the Department of Medical Sciences, Ministry of Public Health; and to train staff in food control.

0070 Vector-borne disease control (1963-65; 1967-68; 1970-) R—To train staff in medical entomology and vector-borne disease control; and to continue the work of the *Aedes* Research Unit, Bangkok (see project Interregional 0306).

0071 School for medical radiography, Bangkok (1965-73) UNDP—To train radiological technicians in X-ray diagnosis, radiotherapy and nuclear medicine at Ramathibodi Hospital, Bangkok.

0075 Strengthening of laboratory services (1968-77) R—To organize national health laboratory services and strengthen the teaching of laboratory sciences and training in medical laboratory technology.

0079 Quality control of drugs (1970-76) R—To strengthen legislation and laboratory competence in the quality control of pharmaceutical preparations and train drug analysts and drug inspectors.

0082 Venereal disease control (1967-) R—To train staff in the clinical and laboratory aspects of venereal disease control and strengthen the control programme.

0086 Dental health (1967-75) R—To improve the education of professional and auxiliary dental staff, and to strengthen dental services.

0089 Nursing education and services (1968-) R—To study nursing needs and resources, strengthen nursing services and

education, develop university-level courses for nurses and organize and conduct studies related to nursing services and education.

0090 National community water supply, drainage, sewerage and pollution control (1969-76) R UNDP UNICEF—To plan, organize and administer a national environmental health programme, including the extension of community water supplies, and to train personnel.

0093 Medical rehabilitation (1968-73) R—To develop rehabilitation services in certain hospitals in the provinces and in Bangkok and to train the necessary staff.

0095 Education in public health (1968-) R—To develop the teaching programmes of the Faculty of Public Health, Mahidol University, Bangkok.

0097 Medical education and training (1971-) R—To develop the teaching and training programmes of the four medical faculties at Chiangmai, Chulalongkorn, Mahidol and Thonburi Universities, and of the Faculty of Postgraduate Studies, Mahidol University, and the Faculty of Dentistry, Chiangmai University.

0098 Health planning and administration (1970-) R—To strengthen and improve national health planning and health administration, with primary emphasis on the phased integration of disease-control and special health programmes, eventually leading to the development of a comprehensive health care service.

0105 Production of biologicals (1971-) R—To develop the production of vaccines and sera and their testing in accordance with WHO minimum requirements, and to prepare national standards and reference reagents for vaccines and sera.

0106 Improvement of anaesthesiology (1971-73) R—To develop training programmes in anaesthesiology at Mahidol University, Bangkok.

0107 National institute of dermatology (1972-75) R—To establish a national institute of dermatology that will provide facilities for diagnosis, treatment, training and research.

0109 School for medical physicists (1971-74) UNDP—To train medical physicists.

0115 Teaching of human reproduction, family planning and population dynamics in medical schools (1970-) UNFPA—To strengthen teaching and research in the medical school departments involved in the teaching of human reproduction.

0117 Faculty of Veterinary Sciences (1972-) R—To strengthen the Faculty of Veterinary Sciences, Chulalongkorn University.

0120 Bioenvironmental engineering (Oct. 1971-July 1972) UNDP—A consultant reviewed the curriculum of the Sanitary Engineering Department, Faculty of Engineering, Chulalongkorn University and the teaching and laboratory facilities and made recommendations for improvements. Some WHO publications and technical books were supplied.

SEARO

0007 Regional assessment team on malaria eradication (1959-61; 1963-) R—To make an independent appraisal of the status of malaria eradication and of any special aspects of the eradication programme in countries of the Region.

SEARO (*continued*)

0030 Smallpox eradication and epidemiological advisory team (1962–) R UNDP VS—To assist the countries of the Region in the eradication of smallpox, in the development of epidemiological services and in training.

0038.2 Production of freeze-dried smallpox vaccine (1967–74) R—To assist countries of the Region with the production of freeze-dried smallpox vaccine.

0042.2 Radiation protection (1968–77) R—To train personnel concerned with the use of ionizing radiation and promote the improvement of measures in health institutions to guard against the harmful effects of radiation.

0064 Community water supply and sanitation (1965–) R VW—To assist countries of the Region in developing urban and rural community water supply and sanitation programmes.

0066 Community water supply (March–Dec. 1971) VW—A consultant surveyed the unfinished municipal water supply schemes in Indonesia and made recommendations concerning their completion; he also assisted in revising the designs for urban water supply systems and advised in the development of a long-term programme for municipal water supplies.

0094.2 External cross-checking of blood films (1968–77) R—To develop and strengthen facilities in the countries of the Region for independent cross-checking of blood films from malaria eradication and control programmes.

0096.2 Medical education (1969–) UNDP—To assist in developing medical education at all levels and adjusting teaching and training programmes to the needs of the countries of the Region and the progress of medical science, train medical educators and promote intercountry exchange of experience in educational matters.

0097 Nutrition training and advisory services (1963–74) R UNICEF—To assist with the training of medical personnel in nutrition, and to advise on public health measures in nutrition.

0099.3 Epidemiology of virus diseases (1967; 1969; 1971–) R—To assist in the development of regional epidemiological surveillance of haemorrhagic fever and in national and international studies to find effective methods of control.

0102 Asian Institute for Economic Development and Planning (1964–) R (ECAFE)—To assist the faculty of the Institute with the health component of training and research.

0104 Organization and administration of hospital and medical care services (1968–) R—To assist in the development of regionalized health services, in the organization of systems of medical care, and in hospital administration.

0113 Regional tuberculosis training and evaluation team (1967–77) R—To provide training in the operations and techniques of national tuberculosis control; assist in the operational assessment and evaluation of integrated national tuberculosis control programmes in the Region; and provide practical assistance to national tuberculosis programmes as required.

0117 Diphtheria/pertussis/tetanus vaccine production (1968; 1970; 1972–77) R UNICEF—To assist in the production of diphtheria/pertussis/tetanus vaccine consistent with WHO minimum requirements.

0125 Plague epidemiology (1968–69; 1972) R—To follow up plague surveillance activities and help to train national surveillance workers.

0128 Training courses in the management of infectious-disease hospitals (1967–77) R—To assist in improving infectious-disease hospitals so that they may provide adequate facilities for diagnosis and treatment, and for training.

0130 Workshops and seminars in health education (1967–70; 1972–) R—To improve the standard of health education and promote its development in the Region through workshops and seminars on various aspects of health education and behavioural sciences.

0139 Short courses for nurses and other health personnel (1967–) R UNICEF—To assist in conducting short courses for nurses and other health personnel in order to acquaint them with new concepts and skills, particularly as regards patient care and family health, and in preparing reference and teaching materials; and to assist countries in areas of nursing services and education that require study.

0144 Rehydration therapy (1967; 1970–77) R—To assist in the production of rehydration fluid and in establishing rehydration centres at children's hospitals and at the peripheral level; and to train staff.

0148 Strengthening and development of health services (1970–) R—To assist in the analysis of WHO-assisted health projects and programmes; to help to identify areas in which operational and cost-benefit studies are needed and participate in the design, conduct and evaluation of such studies; and to assist in co-ordinating all operational studies undertaken by the Regional Office.

0153 Training in immunology (1969–70; 1972–) R—To review progress in immunology, particularly in relation to communicable diseases, and to strengthen training in the specialty.

0159 Health laboratory services (1970–) R—To review the progress achieved in the reorganization of national health laboratory services and their administrative and technical operation and management; to determine ways of standardizing methods, equipment, teaching, recording and reporting in order to formulate guidelines for coordination with recipient services such as epidemiological and health services; and to assist in the training of laboratory personnel.

0161 Hospital statistics and medical records (1969–71) R—To assist countries of the Region (i) in organizing an efficient system for the maintenance and flow of records in hospitals, (ii) in the collection, processing and presentation of hospital statistical data, and (iii) in training medical records and hospital statistics personnel. Provided—a statistician, short-term consultants, and supplies and equipment.

In Burma assistance was given with the development of a central medical records system at Rangoon General Hospital, data processing methods used in this and other hospitals in Rangoon were reviewed, and a study was made of the possibility of establishing a medical records department at Mandalay General Hospital. Outpatient records and reporting systems in government hospitals and health centres were strengthened, and routine collection of statistics on health personnel in hospitals was instituted.

In Indonesia, the project statistician reviewed statistical and record services in the Dr Tjipto Hospital with a view to the establishment of a training centre for hospital records personnel. Assistance was also given with plans for the simplification of the reporting system for data on utilization of hospital personnel and resources and on hospital inpatient morbidity.

A consultant visited Nepal between April 1969 and January 1970 to give assistance with the newly-established medical records office in Bir Hospital in Kathmandu, where good pro-

gress has been made. Inpatient records are well maintained and a statistical statement is prepared monthly. The existing system of reporting and records in hospitals and health centres was reviewed and plans for its improvement discussed with the WHO statistician.

A study of the collection, processing and analysis of statistical data was made in Thailand with a view to their speedier publication and more efficient use for health planning purposes.

Assistance is continuing under project SEARO 0220 (Collection and utilization of health statistics, records and reports).

0168 Training in veterinary public health and promotion of veterinary public health services (1968-70; 1972-) R—To assist in training veterinary public health officers.

0169 Port health (1969-70; 1972-77) R—To assist in strengthening port health services.

0170 Short courses in neonatology (Dec. 1971-Feb. 1972) R—A consultant made an assessment of the results of orientation courses in neonatology held in 1969 in India and 1970 in Burma for paediatricians in medical schools.

0171 Community health aspects of medical education (1970; 1972-) R—To assist medical schools in developing inter-departmental training programmes in health care for the community.

0172 Mental health (1970; 1972-77) R—To organize seminars on various aspects of mental health and to train personnel.

0176 Courses in health laboratory techniques (1969-) R—To assist with courses in health laboratory techniques.

0178 National health planning and manpower studies (1970-77) UNDP—To promote the development of national health planning in the countries of the Region through regional and national training courses, meetings and study groups and consultants to assist in the formulation of national health plans, in delineating the health aspects of development plans, and in strengthening health planning units.

0180 Seminars on immunization services (1972-) R—To hold seminars periodically on the planning and organization of immunization services.

0190 Control of hazards to man from pesticides (1970; 1972-) R—To help to assess the problems related to the importation, storage, transport, handling, labelling and sale of pesticides; recommend measures to prevent or reduce hazards to man arising from the use of pesticides; assist in preparing legislation; advise on the establishment of laboratory competence in this field; and develop studies to investigate the problem in depth.

0192 Regional team on family health (1970-73) UNFPA—To support national and international activities concerned with family health services and with training, evaluation and research in the subject.

0193 Epidemiological surveillance and training (1966-) R—To assist in strengthening epidemiological surveillance programmes covering the most important communicable diseases, in introducing epidemiological surveillance work into the normal functions of local health services, and in training staff.

0194 WHO-sponsored training centre for nurses, Wellington, New Zealand (1970-) R—To provide a training programme for nurses from the Region who cannot obtain admission to regular postbasic courses because of lack of secondary education and/or the language skills required.

0195 Symposium on Vesical Calculus, Bangkok (6-11 Jan. 1972) R—To review current knowledge on vesical calculus and propose research for determining its causes and measures for its prevention. There were 29 participants, including 13 from three countries in the Region. Four consultants and four temporary advisers assisted with the conduct of the symposium.

0197 Seminar on Health Aspects of Care of Normal Children in Day Centres and Institutions, Chiangmai, Thailand (19-24 June 1972) R—To review the nature and extent of the health needs of normal children in day-care centres and institutions and to outline general principles for the guidance of countries of the Region in the development and strengthening of health care programmes for such children. The Seminar was held in the Faculty of Medicine, Chiangmai, and had participants from five countries of the Region. Provided—three consultants and three temporary advisers and the cost of attendance of the participants.

0198 Regional centre for documentation on human reproduction, family planning and population dynamics (1970-) UNFPA—To establish a regional centre for basic literature on aspects of human reproduction, family planning and population dynamics, for the use of countries of the Region.

0199 Group education in service, teaching and research aspects of human reproduction, family planning and population dynamics (1971-) UNFPA—To develop education and studies in human reproduction, family planning and population dynamics.

0206 Medical education in human reproduction, family planning and population dynamics (1972-) UNFPA—To assist in planning, conducting and evaluating short courses for senior medical teachers in order to improve the teaching of human reproduction, family planning and population dynamics in medical schools of the Region.

0211 Public health advisory services, Mekong Committee (1968-) FT—To provide technical advice to the Committee for the Coordination of Investigations of the Lower Mekong Basin, including advice on the prevention of communicable diseases resulting from changes in environment due to man-made lakes and other irrigation works.

0213 Development of health education in family health programmes (1971-) UNFPA—To assist in developing and improving the quality of informational, educational and teaching materials and in planning for more effective use of various communication media for the education of the public and for the preparation of staff in health education.

0214 Symposium on Epidemiology and Control of Venereal Diseases, Bangkok (14-17 Dec. 1971) R—To review venereal disease control measures in countries of the Region, with particular reference to the organization and administration of control programmes. There were eight participants from three countries and 14 observers from the host country. Provided—two consultants, six temporary advisers and the cost of attendance of the participants.

0219 Development of maternity-centred aspects of family health services (1972-) UNFPA—To support country and inter-country activities in family health, and particularly the maternity-centred approach.

0220 Collection and utilization of health statistics, records and reports (1972-) R—To assist in developing consistent systems of record keeping and reporting for health centres and hospitals, in the collection and presentation of the relevant statistical data, and in training the necessary staff.

EUROPEAN REGION

Albania

1001 Vaccine production (1966-72) R—To develop adequate facilities for the production of the vaccines and sera necessary for preventing and controlling communicable diseases.

1002 Central Institute of Epidemiology, Microbiology and Immunology (1965-72) UNDP—To promote the further development and expansion of epidemiological studies on communicable diseases and of specialized training for various categories of personnel.

4301 Resuscitation centre (1967-72) UNDP—To establish a centre to strengthen the organization of resuscitation and casualty services and to train the necessary staff.

8101 Cancer control (1962-72) UNDP—To develop a specialized cancer programme by building up a central institute with up-to-date equipment, and by training physicians, physicists and engineers for the medical and technical aspects of the programme.

Algeria

1001 Surveillance and control of communicable diseases (1971-) R—To identify and define high- and low-risk groups with regard to communicable diseases that constitute major public health problems.

2001 Malaria eradication programme (1968-) R—To eradicate malaria progressively from the country and to provide training facilities for staff engaged in malaria eradication work in Algeria and neighbouring countries.

3001 Environmental sanitation (1963-) R UNICEF—To develop and strengthen environmental sanitation services, promote environmental sanitation work and train sanitation personnel.

3003 Training of sanitary engineers (1971-) R—To train sanitary engineers at undergraduate and postgraduate levels at the sanitary engineering centre, Rabat.

3201 National water authority (1963-78) UNDP—To set up a national water authority responsible for planning and implementing a water development investment programme, carry out pre-investment studies and train personnel.

4001 Development of public health services (1963-) R UNICEF—To plan and organize public health services, with emphasis on extending and improving the basic health services, on training public health personnel at the National Institute of Health and the schools for health personnel, and on some specialized activities such as nursing education and mental health services.

4101 Public health administration (1963-73) R—To plan and organize public health services, coordinate specialized activities and integrate them into the public health services, and train public health personnel.

4201 Public health laboratories (1968-72) UNDP—To organize laboratory services at various levels of the health administration and train laboratory staff.

4901 Epidemiology and health statistics (1963-73) UNDP—To organize health statistical services and train national personnel in health statistics; to use the statistical data collected for determining priorities in public health planning.

5101 Family protection (1963-72) UNDP UNFPA UNICEF—To reorganize and extend maternal, child and family health work in health centres throughout the country, and to develop training facilities for maternal and child health workers and related personnel. Provided—a paediatrician (1963-71), a nurse/midwife (1964-69) and a nurse (1970), consultants and fellowships.

Financial and other difficulties hampered the development of the project during the first five years. The financial situation improved, however, and, by 1970, 130 maternal and child health centres were in operation, as compared with only one in 1964. The work of the project is being continued and expanded under the maternity-centred family planning project Algeria 5102.

5102 Maternity-centred family planning (1972-73) UNFPA—To reinforce and develop various aspects of family protection, including maternal health, prenatal, postnatal and child care, spacing of childbirths and medical and social family care. The project is based mainly on the existing maternity centres and special attention is being given to the training of health personnel at all levels and to health education aspects.

5601 Malnutrition and dietary deficiencies control (1963-71) R UNICEF (FAO)—To prevent dietary deficiencies, increase the resistance of the population to pathogenic agents and create optimum conditions for normal physical and mental growth and development. Provided—a nutritionist (1963-71) and supplies and equipment (including educational material).

A nutrition section was set up in the National Institute of Health in 1964 and in 1968 a central bureau for nutrition was established in the Ministry of Public Health. In 1965, the National Institute of Health opened a nutrition rehabilitation centre with accommodation for 40 children; staffing difficulties limited its use during the first two years, but since 1967 it has been utilized to full capacity.

A school of dietetics was set up in 1964 to train specialized staff of a new type, adapted to conditions in the country. Fellowships in public health nutrition were awarded (under other projects) to two physicians and two technicians. The WHO nutritionist participated in the training in nutrition of specialized and non-specialized staff and participated in nutrition education work. He also prepared a nutrition manual.

Surveys carried out at the start of the project with the assistance of the WHO nutritionist showed an incidence of rickets in children of from 30% to 80%, as well as many cases of protein malnutrition, deficiency anaemia, endemic goitre, and osteomalacia in pregnant women. Important steps towards the control of these conditions were the decree of 1968 making the iodization of salt compulsory, and the development of a weaning food made from local food products. Acceptability tests of this food were carried out with the assistance of the WHO nutritionist and it is now being manufactured on an industrial scale.

It is planned to provide consultant services to follow up on the activities initiated under the project.

6101 Training of health personnel (1970-72) R—To improve the training programmes for all categories of health personnel.

6102 Institute of Medical Technology, Constantine (1970-74) UNDP—To establish an institute for the training of medical assistants and public health midwives to meet the country's urgent requirements.

6202 Medical education (1971-) R—To develop new teaching methods in medical faculties and train teachers and technicians.

Austria

4401 Nursing education and administration (1968; 1970-) R—To prepare nurses for administrative and teaching posts.

Bulgaria

4001 Scientific Centre for Hygiene and Epidemiology (1968-74) UNDP—To establish a central technical and scientific body grouping a number of formerly independent specialized institutions. The functions of the Centre will be to collect, process and evaluate information as a basis for planning the development of health services; and to train medical and allied personnel and carry out research as a faculty of the postgraduate medical school.

6001 Training of medical teachers (1972-) R—To provide additional training in the educational sciences to teachers in medical teaching institutions.

Czechoslovakia

3101 Federal research and development centre for environmental pollution control (1969-75) UNDP—To establish in Bratislava a federal research and development centre for environmental pollution control, with subcentres in Prague and Bratislava.

Greece

3101 Environmental pollution control, metropolitan area, Athens (1971-75) UNDP—To develop a comprehensive environmental pollution control programme for the Athens metropolitan area.

3401 Environmental sanitation (1967-72) UNDP—To assess solid waste disposal problems in urban areas through a general review, followed by a specific study of one or two cities where the situation is more acute.

4001 Development of public health services and training of personnel (1958-72) UNDP UNICEF—To organize comprehensive and coordinated health services in a rural area where new methods of public health administration can be tested, practical training can be given to all categories of public health personnel, and demonstration and research can be carried out. Services for vital and health statistics, maternal and child health, dental health, medical care, mental health and environmental health are being organized in the demonstration area.

Hungary

3001 Training of sanitary engineers (1965; 1967-69; 1971-72) UNDP—To organize the training of sanitary engineers and to train teachers of sanitary engineering.

3101 Pilot zones for water quality management (1969-76) UNDP—To establish pilot zones for water quality management, with a view to collecting data and developing a rational basis for investment in water quality improvement.

4201 Public health laboratories (1971-75) R—To improve health laboratory facilities by introducing or extending the application of new diagnostic procedures and investigating the possibility of producing new biological substances.

6201 Medical training institutes (1966-72) R—In 1966, in accordance with the original aim of the project, which was to promote the teaching of human genetics to medical students, a consultant advised on the development of teaching and research in medical genetics at the medical faculty at Szeged and in microbial genetics at Debrecen. The project was redefined in 1967, the objectives being the investigation of new trends in medical schools (including new methods and techniques of teaching and learning, and the organization of medical schools to provide coordinated and integrated teaching, together with the necessary changes in curricula). In 1968 two temporary advisers lectured in Hungary on the integration of the medical curriculum and undergraduate medical education at the Second Medical Institute, Moscow. In 1969 a seminar on evaluation of medical education, attended by members of the four Hungarian medical faculties, was held in Debrecen, with the assistance of three evaluation experts from the Organization. At the seminar proposals were made for a three-year programme (1970-72) to be assisted under the project; a working party was set up to plan activities and a topic for a seminar in 1970 was agreed upon. Later, however, the Government decided not to organize another seminar but to concentrate on the provision of fellowships to enable medical teachers to observe developments in medical education in other European countries. Between 1967 and 1972, 24 such fellowships were awarded.

Italy

4101 Reorganization of regional public health services, Friuli-Venezia-Giulia (March-May 1972) R FT—Two consultants assisted in making a review of existing resources and pending health legislation, and in defining areas requiring further study, and submitted suggestions concerning the organization of the health and medical services in the Friuli-Venezia-Giulia region.

4401 Nursing education and administration (1960-65; 1967; 1969-) R—To prepare nurses for teaching and administrative posts and develop basic and postbasic nursing education programmes.

Luxembourg

4001 Public health services (1971-) R—To further the development of the public health services.

Malta

3201 Wastes disposal and water supply (1966-72) UNDP—To carry out engineering and feasibility studies and draw up a construction and investment programme for immediate and phased long-term plans for the improvement and development of waste disposal and water supply facilities; also to investigate the legal, managerial and financial aspects of the programme.

5401 Mental health services (1965-66; 1968-72) UNDP—To plan and develop the psychiatric services, and especially the training of nursing personnel.

Morocco

1001 Surveillance and control of communicable diseases (1970-) R—To assess the extent of the communicable diseases that are major public health problems in the country, especially salmonellosis, venereal diseases, cerebrospinal meningitis and leprosy, with a view to implementing effective and economical control measures.

Morocco (continued)

1701 Communicable eye disease control (1952-71) UNDP UNICEF—To organize an intensive campaign against acute conjunctivitis and systematic treatment of trachoma in school-children; to establish a health education programme covering the whole population; and to set up a programme for treatment of complications due to trachoma and acute conjunctivitis. Provided—an ophthalmologist (1954-69), a sanitary engineer (1953-56) and a statistician (1954-57), and 14 fellowships (including two under other projects).

When the project began, trachoma and seasonal conjunctivitis were responsible for most of the cases of blindness and visual impairment, which affected roughly 90% of the population. Mass treatment and health education campaigns were organized throughout the country. At a later stage, efforts were made to integrate specific antitrachoma activities into the basic health services. Extensive evaluation studies were made and the results published.

The main achievement of the project is the significant lowering of severity of the disease, with the consequent decrease in visual impairment and blindness rates. In addition, the activities undertaken have contributed to the definition of a series of problems in the field of public health ophthalmology. An outline for a long-term plan for their gradual solution was submitted by the WHO ophthalmologist.

2001 Malaria pre-eradication programme (1962-) R—To prepare for a malaria eradication programme by the organization of technical, administrative and operational services; and to train medical and allied personnel of public health services (especially rural health services) in malaria eradication concepts and techniques.

3002 Training of sanitary engineers (1968-) R—To train sanitary engineering teaching personnel and specialists at university level.

3003 Environmental hygiene (1971-73) UNDP—To reinforce the environmental sanitation services, promote environmental health programmes and train personnel. This project provides also for follow-up of the environmental health aspects of programmes for socioeconomic development, particularly those receiving assistance from UNDP or other agencies.

3201 Water supply and related studies, phase II (1969-73) UNDP—To prepare a master plan for national and regional water supplies, and pre-investment studies on water supply and waste disposal in the coastal region between Kenitra and Casablanca and on water supply for one or two towns in the remainder of the country. The project includes economic and organizational studies as well as the training of personnel.

4001 Development of public health services and training of personnel (1971-) R—To plan and organize public health services and especially to extend and improve the basic health services within the framework of the economic and social development plan. The work includes the establishment of a network of hospital and preventive services, the education and training of staff, especially teaching staff, for the health professions, and the reinforcement of specialized activities such as nursing, nursing education and mental health services.

The project is being implemented in association with project Morocco 2001 (Malaria pre-eradication programme).

5101 Maternal and child health services (1972-76) R—To carry out studies and operational research on different aspects of maternal and child health, with special attention to the role of health services in rural areas. Related aspects of medical edu-

cation and training, and general environmental aspects, will be included in the studies.

6201 Medical education (1960-64; 1966-75) R—To strengthen teaching and research in preventive and social medicine and in the basic medical sciences at the Faculty of Medicine, Rabat, and to train national staff.

Poland

1201 Tuberculosis control (1960-74) UNDP UNICEF—To carry out tuberculosis control work and to follow up the results of the studies carried out since 1964 on the detection and treatment of new cases in pilot tuberculosis control areas. Studies on the epidemiology of tuberculosis in Poland and tests on the immunogenic value of BCG vaccine are also envisaged.

3001 Comprehensive development of the Vistula River system (1970-71) UNDP/UN—Three consultants advised on thermal pollution problems, on fibreboard waste management, and on water quality and water quality management.

3101 Protection of river waters against pollution (1965-72) UNDP—To undertake laboratory research and field investigations for the development of a long-term programme for the protection of waters against pollution. The studies were concentrated on the abatement of pollution caused by (i) municipal and industrial waste effluents; (ii) thermal effluents from conventional power plants; and (iii) saline effluents from coal mines. Provided—a project manager (Aug. 1966-Feb. 1969; April 1970-May 1971), consultants (59 visits totalling 105 man-months), services of a subcontractor for the saline pollution component, 91 fellowships, and equipment.

The field work started in 1966. As the work programme and international concern about environmental pollution grew, the project received increasing support from the Government and people. The specific objectives of the project were achieved. However, as knowledge of the water pollution problems was limited when the project began, the definition of objectives was probably too narrow. No amendment to the plan of operation was made, but three adjustment advices were signed which permitted the rephrasing of the project and its extension by one year. On the basis of experience new fields of study were initiated. The consultants' visits were programmed in accordance with specific needs and their reports served to assist the government counterparts in their research activities. A technical report on the project findings was prepared by the Polish project staff.

The work of the project is being continued and extended under the new project Poland 3102 (Environmental pollution abatement centre, Katowice).

3102 Environmental pollution abatement centre, Katowice (1971-75) UNDP—To promote the control of air and water pollution, liquid and solid wastes treatment and disposal, and water and air quality management.

5401 Mental health (1967-74) UNDP—To provide training in child mental health and the rehabilitation of psychiatric patients in order to strengthen the mental health services.

6202 Training in social medicine (1971-) R—To develop curricula in social medicine and public health in medical faculties and to train teachers in methods of teaching these subjects.

Romania

3101 Water and air pollution control, phase I (1969-72) UNDP—A project manager and short-term consultants, as well as laboratory equipment and over 20 fellowships, were provided to

assist in strengthening the Institute of Hydrotechnical Research, to enable it to investigate and to develop methods leading to control of severe and urgent water pollution problems.

Field operations began in July 1970 and terminated in December 1971. The project activities consisted of studies of industrial waste water treatment, laboratory studies of water pollutants, studies of design details for automatic stations to monitor river pollutants, and studies of the eutrophication process in lakes. During the course of the project, the Institute of Hydrotechnical Research was reorganized and became the Institute for Studies, Research and Design for Water Management. As now constituted, the Institute will be the central point for the work on water protection in the country, which will be continued and extended under phase II of the project (Romania 3102).

3102 Water and air pollution control, phase II (1971-74) UNDP—To establish a programme for air and water pollution control, carry out studies on various aspects of pollution, methods of treatment and control, and train personnel.

4001 Emergency assistance (1971-72) UNDP—Equipment was provided for the production of vaccines.

6301 Training of health personnel (1970-) R—To develop postbasic teaching institutions and prepare teachers for various groups of health personnel.

Spain

1901 Epidemiological studies of virus diseases of public health importance (1959; 1964-69; 1971-72) UNDP—To study methods for the prevention and control of enteric, respiratory and other virus diseases of public health importance and to provide training facilities.

3101 Pollution in the Bilbao district (1971-72) UNDP—To investigate the problem of air pollution in the metropolitan area of Bilbao, particularly as regards emissions from the steel and chemical industries.

4001 Health demonstration and training area (1965-69; 1971) UNDP—To set up, as part of the general plan for socioeconomic development, a public health demonstration and training area with a complete network of coordinated rural health services. Provided—three consultants, two temporary advisers, fellowships and some supplies and equipment.

The establishment of the project coincided with the preparation by the Directorate-General of Health of a five-year plan of action. It was decided to set up the health demonstration area at Talavera de la Reina, where a new health centre would be the focal point. The area was to be used for testing administrative and technical methods, for carrying out surveys and, in collaboration with the National School of Public Health, for training various categories of staff. In 1968 the Government allotted funds for the construction of the demonstration area and a consultant reviewed the plans for the construction of a hospital and a health centre. The plans were subsequently approved by the Government and construction began.

The project was gradually reoriented to include all aspects of the organization of the public health services. In 1967 a consultant (public health administrator) made recommendations for a general reorganization of the health administration at both central and provincial levels and for the training of health personnel. Further recommendations were submitted by a consultant in environmental health in 1968.

The main achievements of the project were in the field of training. Two groups of public health doctors—11 in 1967 and nine in 1968, each group accompanied by a WHO temporary adviser—studied the work of the demonstration areas in France

(Soissons) and Yugoslavia. Thirty-eight fellowships were awarded, including 21 in health administration and two in hospital planning.

4401 Nursing education and nursing service administration (1957; 1960-64; 1971-) R—To develop and strengthen postbasic and basic nursing education programmes by preparing nurses for administrative and teaching posts in basic and post-basic schools of nursing and in nursing services.

5401 Mental health services (1966-69; 1971-72) UNDP—To develop the mental health services, especially those for the rehabilitation of psychiatric patients.

6101 Training of health personnel (1971-) R—To prepare teachers and develop teaching institutions for various categories of health workers, particularly sanitarians and laboratory technicians.

6201 Medical education (1971-) R—To improve medical education by developing curricula and methods of teaching and evaluation, with emphasis on new faculties, carrying out relevant studies, and providing training facilities abroad for the study of medical education.

Turkey

2001 Malaria eradication programme (1957-) R

3001 Environmental sanitation (1964-) R—To develop the environmental sanitation services and train sanitation personnel.

3002 Promotion of training and programmes in sanitary engineering, Middle East Technical University (1968; 1970-73) UNDP—To train environmental health personnel at professional and subprofessional levels at the Middle East Technical University, Ankara, and to promote specific environmental health programmes in various government agencies.

3003 Promotion of training and programmes in sanitary engineering, Istanbul Technical University (1970-73) UNDP—To train environmental health personnel at professional and subprofessional levels at the Istanbul Technical University and to promote specific environmental health programmes in various government agencies.

3201 Master plan for water supply and sewerage for the Istanbul region (1965-72) UNDP—To prepare a master plan, and feasibility and preliminary engineering and other organizational studies, for the extension and improvement of the water, sewerage and storm drainage systems of Greater Istanbul and the developing industrial areas in the vicinity. Provided—a project manager, services of consulting engineers, fellowships and supplies and equipment.

The project studies were carried out by a consortium of consulting engineering firms. For water supplies, a staged programme of construction and investment was proposed, designed to increase the water supplies in the project area to meet the needs of a population estimated at 5 million in 1985 and 9 million in 2020. The increase would be achieved by the development of the existing water resources in the European side of the Bosphorus and the construction of new resources on the Asian side. The construction of adequate distribution schemes was also proposed. As regards sewerage, the proposals were for a small number of long outfalls into the Bosphorus and the Sea of Marmara, through which sewage and industrial wastes would be discharged after adequate treatment. The construction of a separate storm drainage system was envisaged.

The expansion of the Istanbul water supply system is being carried out by the Government. The World Bank has provided a loan in this connexion.

Turkey (continued)

Apart from its direct results, the project enabled 50 specialists to study abroad, and many counterpart specialists gained experience in the planning and design of water supply and sewerage. Two water laboratories and a sewerage laboratory were set up with the equipment provided, and are being operated by the relevant works departments.

4001 Development of public health services and training of personnel (1970-) R UNICEF—To strengthen national health services at the central, regional, and peripheral levels.

4201 Training of public health laboratory technicians (1969-) R—To train laboratory technicians required for the development of countrywide public health laboratory services and prepare an expanded teaching programme.

6201 Training in preventive and social medicine (1969-) R—To develop undergraduate and postgraduate medical education. The project provides for continuation of assistance to the School of Public Health, Ankara, and for assistance, chiefly in preventive and social medicine, to new medical schools.

Yugoslavia

3201 Community water supply, wastes disposal and pollution control, Kosovo (1967-69; 1972-75) UNDP—To develop a programme for water pollution control, community water supply and wastes disposal in Kosovo Province.

4101 Public health administration (1969-72) UNDP—To provide training facilities and equipment for the federal and republic institutes of health.

4102 Regionalization of health services and health insurance in Serbia (1972-73) R—To establish a functional organization of health services, backed by a suitable health insurance organization.

8001 Chronic and degenerative diseases (1969-72) UNDP—To provide training facilities and equipment for the chronic and degenerative disease centres to be set up in certain republics.

8401 Trachoma control and prevention of loss of vision (1967-71) UNDP UNICEF—Laboratory equipment was provided and two fellowships were awarded in support of the project, which was aimed at eliminating the last foci of active trachoma, designing a programme for early case-finding and treatment of squint and amblyopia, and establishing the basis for centres for the prevention of loss of vision.

During the course of the project the number of trachoma cases was considerably reduced, although residual foci remain in some areas. Four pilot centres are operating for the treatment of noncommunicable blinding eye conditions. Ophthalmological departments have been established in the Maternal and Child Health Institutes in Belgrade and Zagreb.

EURO

1001 Development of national programmes for the surveillance of communicable diseases (1970-) R—To assist countries in initiating or developing national programmes for the surveillance of communicable diseases of public health importance and to stimulate, assist and coordinate intercountry cooperation and exchange of information in this field.

1101 Working Group on the Intercountry Spread of Venereal Diseases, Copenhagen (7-10 Dec. 1971) R—To appraise methods for national epidemiological surveillance of venereal diseases and

for the exchange of information between countries, propose procedures for rapid and effective case-finding and contact tracing between countries of the Region, and discuss how WHO could further promote and coordinate the development of surveillance and control of venereal diseases. There were 10 participants (temporary advisers) from 10 countries of the Region, and an observer from one. Three representatives of the International Union against the Venereal Diseases and the Treponematoses attended the meeting.

1204 Seminar on the Evaluation of Tuberculosis Control Programmes, Copenhagen (19-23 June 1972) R—To discuss methods of evaluating the effectiveness and efficiency of tuberculosis control programmes and of their different components, and to define the methods by which countries of the Region could most easily adapt their tuberculosis control measures to the present epidemiological situation. There were 19 participants from 18 countries of the Region, and eight observers from three countries. A representative of the International Union against Tuberculosis attended. Provided—a consultant, eight temporary advisers and the services of staff members.

1205 Development of national tuberculosis control programmes (1972-74) R—To assist countries in developing certain aspects of their tuberculosis control programmes and in evaluating their effectiveness.

1401 Conference on Cholera Control in Europe, Copenhagen (15-17 Dec. 1971) R—To review the cholera situation in countries of the Region, work out a strategy for preventing the spread of cholera in Europe, and define national and international responsibilities and the measures to be taken with particular reference to population movements (e.g., tourists and migrant workers). There were 42 participants (public health administrators, epidemiologists and specialists in infectious diseases and laboratory work) from 29 countries of the Region. Provided—two temporary advisers and the cost of attendance of one participant.

1901 Working Group on the Prevention of Rubella, Budapest (12-16 June 1972) R—To review the known extent of rubella, including congenital rubella, and current methods of investigating the disease; and to propose a surveillance procedure and preventive action by vaccination suitable for countries of the Region. There were 12 participants (temporary advisers) from 10 countries of the Region.

1902 Working Group on Measles Vaccination, Algiers (25-29 April 1972) R—To review the experience of countries in the mass application of various types of measles vaccine and the epidemiological criteria used to guide vaccination policies; and to consider what preventive action would be most suitable for the countries of the Region. There were 11 participants (temporary advisers) from 10 countries of the Region. A representative from UNICEF attended.

2002 Entomological services to North African countries (1965-72) R—To provide entomological advice for the malaria projects in Algeria and Morocco and, if necessary, for those in Turkey and other countries.

3001 Training for environmental health engineers (Russian language) (1966-) R—To assist the annual postgraduate course in sanitary engineering in Poland. Provided for the fourth course (28 Nov. 1972-28 Aug. 1973)—six fellowships to trainees from three countries of the Region.

3002 Training for environmental health engineers (French language) (1967-) R—To assist in the development of an academic course for sanitary engineers and provide training for teaching staff.

3006 Manpower requirements in environmental health (1972-) R—To make a survey of manpower requirements in environmental health, covering the various categories of executive and operative personnel, as a basis for evaluating current training programmes and preparing new ones.

3106 Health aspects of air quality management (1971-) VD—To review scientific and technological information on air quality control with specific reference to public health; and to prepare manuals and codes of good practice in air pollution control and study their application in pilot areas.

In 1972 two meetings of temporary advisers were held to review a draft manual on air quality in Europe. The first, held in Düsseldorf (27–29 March), had nine participants from eight countries, and the second, held in Frankfurt-am-Main (13–15 September), had 10 participants from eight countries. They were attended by representatives from ECE, WMO and the Commission of the European Communities. A consultant was provided for both meetings.

3107 Training in new methods of environmental pollution control (1972-) R—To promote the training of European specialists in new methods of analysing and controlling environmental pollution.

3109 Health hazards and ecological effects of persistent substances in the environment (1971-) R VD—To study the routes by which persistent substances discharged into the environment can find their way back to man and investigate and evaluate their ecological effects and the health hazard they represent; to recommend guidelines for the establishment of acceptable concentrations of various persistent substances in the ecosystem; and to study the use of experimental ecosystems and mathematical models in predicting the behaviour of persistent substances in different ecosystems.

A working group met in Helsinki from 10 to 14 April 1972 to review available information on the acute and long-term effects on human health and on the ecological effects of arsenic, cadmium, lead, manganese and mercury, with a view to providing background information for the consideration of drinking water standards, and to identify gaps in present knowledge and propose priority items for further research. There were 10 participants (temporary advisers) from eight countries and a representative of the International Council of Scientific Unions. Two consultants were provided.

3110 Analytical methods in water pollution control (1971–73) R—To study the analytical methods and sampling procedures employed in water pollution control throughout the Region, with a view to obtaining agreement on uniform methods, procedures and way of expressing results; and to study the need for and promote the development of new methods.

A working group met in Copenhagen from 7 to 10 November 1972 to discuss a proposed outline for a manual on water analyses, for use in water pollution control, and (in connexion with the chapter of the manual dealing with analytical techniques) to appraise the methods selected for routine and for less frequently used analyses. There were 11 participants (temporary advisers) from eight countries of the Region; representatives of the International Association on Water Pollution Research and the International Organization for Standardization and a staff member also attended. Two consultants were provided.

3113 Mathematical models for river-basin management (1972) R—To review experience in the design and use of mathematical models for river-basin management and study the possibility of developing designs for a number of typical models that could be adopted for different basins.

3114 Long-term effects on health of air pollution (1971–73) R VD—To promote clinical, physiological and epidemiological investigations on the long-term effects of air pollution on health, especially on the health of population groups at high risk.

A working group met in Copenhagen from 14 to 18 February 1972 to review a draft working protocol for a study on chronic respiratory diseases in children in relation to air pollution and to reach agreement on the areas where pilot studies will be conducted. The group also reviewed the methods used and results obtained in other studies on the epidemiology of chronic lung diseases in relation to air pollution. There were 11 participants (temporary advisers) from five countries of the Region.

3118 Health education in environmental pollution (1972–73) R—To study and propose information programmes that may be used in the Region to promote the participation of community leaders in environmental pollution control activities.

3121 Environmental pollution information systems (1972-) VD—To obtain information on administration of and existing rules for pollution control and on control projects in the Region, and to design regional information systems.

3125 Recreational water quality on beaches (1971-) VD—To compile available knowledge on water quality requirements for bathing beaches, undertake further studies with a view to preparing manuals and codes of good practice for bathing water and beach sanitation, establish collaborative programmes on sampling and analysis of beach pollution, and promote epidemiological studies on the role of polluted beaches and water used for recreation in causing infection among tourists.

3128 Ecological aspects of water pollution in specific geographical areas in Europe (June 1972) VD—A consultant visited several countries to obtain information on present and planned programmes relating to the control of pollution in the North Sea, in preparation for a working group convened at Bilthoven, Netherlands, from 6 to 8 December 1972.

3402 European model code of practice for the land disposal of solid wastes (1970–73) R VD—To review current trends with regard to the public health aspects of waste reclamation, disposal practices in congested areas and disposal of refuse into sewage; and to make proposals for further activities in conjunction with the headquarters programme in this field.

A working group met in Copenhagen from 11 to 13 October 1972 to appraise a draft model code of practice for the land disposal of solid wastes in Europe, intended to provide governmental and other agencies, and particularly health administrations, with procedures and recommendations to assist them in the establishment and/or management of solid waste landfill. There were 10 participants (temporary advisers) from nine countries of the Region; representatives of the Organization for Economic Cooperation and Development and the WHO International Reference Centre on Wastes Disposal, and a staff member, also attended. A consultant was provided.

3903 Legislative and administrative measures for noise control (1972-) VD—To make a study of legislative and administrative measures for the control of noise in the environment.

4001 Study on the functions of central institutes of public health and hygiene (1970–71) R—To study the organization of national and regional institutes of public health or hygiene conducting technical, educational or research activities in certain countries of the Region.

On the basis of information collected from most of the Member States in the Region and from consultants' reports on visits to countries, a consolidated report on the study was prepared and will be used for a symposium on the same subject to be held in 1973.

EURO (*continued*)

4004 Working Group on the Evaluation of Public Health Programmes, Burgas, Bulgaria (29 Aug.–1 Sept. 1972) R—To summarize the experience of countries in the evaluation of public health programmes and prepare a programme for training courses in this subject. There were 13 participants (temporary advisers) from 12 countries of the Region. A consultant was provided.

4101 Advanced training course on health planning (in English), Sweden and Union of Soviet Socialist Republics (29 Oct.–2 Dec. 1972) R—To introduce methods of health planning within the framework of national economic development. Provided—four lecturers, fellowships (including two under other projects) to 16 trainees from 14 countries, and the services of a staff member.

4102 Information on health planning, economics and manpower (1970–) R—To follow up the work of the Regional Office by reviewing in documented form, for the guidance of national and regional health administrators, experience acquired on short- and long-term health planning in the Region.

4104 Working Group on Problems of Health Planning in National Development, Stockholm (19–22 June 1972) R—To obtain information about the different systems of health planning in Europe and to make recommendations on further studies and research in this field as well as on the draft agenda for a conference on national health planning scheduled to take place in 1974. There were nine participants (temporary advisers) from nine countries. A representative of the International Hospital Federation and three staff members attended. Two consultants were provided.

4201 Public health laboratory services (1972–) R—To assist in developing public health laboratory services and in organizing the training of laboratory staff; and to bring up to date the Directory of Public Health Laboratories in Europe and supplement it with information on training facilities in various laboratories in the Region.

4302 Study on the efficiency of medical care (1970–71) R—A consultant visited six European countries to study recent developments and follow up national studies on the efficiency of health care made since the 1966 symposium on the subject. The information collected was used as background material for the Symposium on the Efficiency of Medical Care (see project EURO 4308).

4305 Role of social insurance institutions in preventive medicine (1971–73) R—To study the role of social insurance institutions in a number of European countries in the light of the need for integrated preventive and curative health services; and to define the extent to which preventive services should be included in the work of such institutions.

4306 Consultant services on the organization of community health care (1972–) R—To meet requests, sometimes of an urgent nature, for expert advice on specialized aspects of medical services, and to assist in national and international conferences and seminars in this field.

4307 Study of the influences of functional changes on hospital design and operation (1972) R—To assemble information on the way in which the introduction of progressive care, progress in medical sciences, and technical innovations have been influencing the functions, architectural requirements and financial needs of hospitals, and to prepare a report describing the situation and probable future trends. At a meeting held in Copenhagen on 26 and 27 October 1972, four temporary advisers—a physician,

a hospital architect, a hospital administrator and a hospital engineer—from four countries of the Region discussed papers they had prepared on their respective specialties and drew up an outline for the final report on the study, to be published in 1973.

4308 Symposium on the Efficiency of Medical Care, Brussels (7–11 Nov. 1972) R—To discuss the application of general evaluation principles and methods to individual branches of the medical care services. There were 13 participants (investigators and senior public health officers) from 10 countries of the Region. Representatives of ILO, the International Hospital Federation, the World Medical Association and the International Social Security Association attended. Provided—two consultants and nine temporary advisers, and the services of a staff member.

4402 International school of advanced nursing education (Russian language), Poland (1969–) R—To give assistance to advanced nursing education in Russian, similar to that previously given to nursing education in English and French, for preparing nurses for leading positions in specialized branches of nursing, for nursing education and administration, and for research.

4404 Study on nursing resources and staffing patterns (1970–71) R—To assist countries in conducting national surveys to determine the personnel required to provide adequate nursing care and coordinate the organization and development of nursing education and services; also to assist with studies of nursing practice, education and training, and with the organization of nursing seminars.

A consultant assisted eight countries of the Region in carrying out surveys of nursing studies. Advice was given on the reorganization and further development of the Higher School of Nursing, Ege University, Izmir (Turkey), and on the evaluation of the programme of the International School for Advanced Nursing Education, Lyons (France). Similar advice was provided to Italy, Poland and Romania. National nursing seminars and courses in Italy and Switzerland were assisted.

Collection of information on legislation for nursing, midwifery and medicosocial work was begun, in preparation for the publication of a digest of legislation in these fields.

Work started under this project is being continued under project EURO 4407 (European studies in nursing, midwifery and medicosocial work).

4406 Course for psychiatric nurse tutors on new approaches to psychiatric nursing care (in French), Paris (30 Sept.–15 Oct. 1972) R—To provide training in modern psychiatric nursing practice and instruction in the use of audiovisual equipment in the teaching of psychiatric nursing personnel. There were 16 trainees from 12 countries of the Region. Provided—two lecturers and fellowships for 14 trainees.

4407 European studies in nursing, midwifery and medicosocial work (1972–75) R—To make studies of specialized fields of nursing, midwifery and medicosocial work in which changes are taking place rapidly, and of patterns of nursing administration, medicosocial work and midwifery services in European countries; also to assist countries wishing to hold meetings and to undertake surveys and studies in nursing education, nursing personnel systems and patient care. The project follows up the studies on advanced nursing education and on nursing resources and staffing patterns (projects EURO 4401 and 4404).

4408 Symposium on Higher Education in Nursing, The Hague (30 Oct.–3 Nov. 1972) R—To consider preparation for nursing, nursing education patterns in the process of reorganization and nursing education programmes already established as part of a system of higher education, and to discuss the educational requirements for nursing teachers, administrators, research

workers, and consultants and for nurses specializing in clinical fields. There were 29 participants from 20 countries of the Region. Representatives of the International Council of Nurses and the Western European Nursing Group attended. Provided—a consultant, 10 temporary advisers, the cost of attendance of 28 participants and the services of a staff member.

4502 National courses, conferences and seminars in health education for senior health personnel (1968–) R—To assist national courses, conferences and seminars for physicians and leading health personnel responsible for promoting health education and to facilitate the attendance of similar staff from neighbouring countries by the award of fellowships.

4901 Health statistical services (1962–) R—To support and conduct studies on various subjects, including the accuracy and comparability of statistics on causes of death, the epidemiology of home accidents, methods of surveillance of congenital pathological conditions, the use of continuous population samples in health surveys, the use of social security records as sources of health statistical information, the measurement of the consumption of psychotropic drugs, the linkage of child health records, and national health information systems. This project is linked with projects EURO 4905 and EURO 4906.

4903 Course on methods of medical statistics and epidemiology (in French), Brussels (1 Feb.–2 June 1972) R—To provide training in medical statistics and epidemiology. The course has been held annually by the Free University of Brussels since 1962. In 1972 there was also a special course (29 May–5 June) on the epidemiology of cardiovascular diseases. Provided—two lecturers and two fellowships for the special course, and seven fellowships for the entire course, to trainees from five countries of the Region.

4904 Course on the application of statistical and epidemiological methods to medicine and public health (in Russian), Bratislava (14 Sept.–22 Dec. 1972) R—To train physicians and health statisticians in the application of statistical methods to public health and to epidemiological and clinical studies. The 1972 standard course was interrupted by a special course (4–8 December) on the epidemiology of cardiovascular diseases. Provided—three lecturers for the special course, and fellowships for nine trainees from six countries for the entire course.

4905 Epidemiological studies (1966–) R—To study and report on specific aspects of mortality and morbidity of particular interest to the Region, starting with a study among cases of stomach cancer. If appropriate, the findings will be presented to the annual sessions of the Regional Committee for Europe. Also, to coordinate and assist limited intercountry studies on relevant epidemiological subjects, including the epidemiology of stomach cancer, the occurrence of abortions, the occurrence of suicide, and chronic respiratory diseases. This project is linked with project EURO 4901 (see above).

4906 Study on medical certification of causes of death (1968–72) R—To study the evidence on which the diagnosis of the cause of death is based, and the way in which it is interpreted in different European countries. Emphasis is placed on the diagnosis of ischaemic heart disease but the study also covers cancer of the gastrointestinal tract.

4909 Preparation of the Ninth Revision of the International Classification of Diseases (1971–73) R—Three working groups were held at the WHO centres for the classification of diseases. The first meeting took place in 1971 in London.¹ The second meeting, held in Paris from 11 to 14 April 1972, had nine partici-

pants (temporary advisers) from nine countries of the Region and was attended also by representatives of the centres in London and Paris and by two headquarters staff members. The third meeting, held in Moscow from 14 to 17 November 1972, had five participants (temporary advisers) from five countries of the Region, and a representative of the centre in Moscow and a headquarters staff member attended.

4911 Symposium on the Identification of High-risk Persons and Population Groups, Windsor, England (16–19 May 1972) R—To review and assess existing and potential methods by which individuals and population groups that run a high risk of disease, disability or death can be identified, so that measures of surveillance and prevention, and early treatment, can be undertaken. Provided—10 temporary advisers and the cost of attendance of 16 participants from 16 countries of the Region.

4913 Study on the integration of health statistics and social and economic statistics (1972) R—To examine the types of statistical information available in certain European countries and assess the possibilities of integrating statistics on health, social phenomena and economics. The study is being made in preparation for a meeting on the subject to be arranged by the ECE Conference of European Statisticians in 1973.

5103 Evaluation of maternal and child health services in certain countries of the Region (1972–73) R—To undertake, in certain countries of the Region, an evaluation of the maternal and child health work carried out during the past 20 years.

5104 Training in family health, including family planning (1972–) UNFPA—To assist in the postgraduate training of doctors and nurses in various aspects of family health, including maternal and child health, and family planning.

5105 Family health, including family planning (1972–) UNFPA—To assist countries of the Region in family health, including maternal and child health, family planning activities, and relevant studies; and to provide guidance for intercountry activities concerned with the training, research and services (especially basic health services) required for the delivery of maternal and child health and family health care.

5203 Joint ILO/WHO Conference on the Teaching of Occupational Health and Safety, Milan, Italy (26–30 June 1972) R—To discuss, in the light of modern trends in occupational health and of the educational process, how best to train the staff needed for occupational health and safety services. There were 25 participants (temporary advisers)—five from ILO and 20 from WHO—from 16 countries. A representative of ILO and five WHO staff members attended.

5411 and 5413 Joint meeting of Steering Committees on the planning and control of long-term programmes, Copenhagen (24–25 Jan. 1972) R—The Steering Committee on the Planning and Control of the Long-term Programme on Alcoholism and Drug Dependence met jointly with the Steering Committee on the Planning and Control of the Long-term Programme in the Field of Child and Adolescent Psychiatry, to review the scope and content of the programmes, and suggest possible amendments in the light of new priorities, a second objective being to facilitate the exchange of information between individuals and organizations concerned with activities in the two areas. There were nine participants (temporary advisers) from six countries of the Region, observers from two countries, and representatives of the United Nations, the Council of Europe, the International Council on Alcohol and Addictions, and the International Union for Child Welfare. Staff members from WHO headquarters attended. The Steering Committees decided to hold separate meetings in future.

¹ See *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 325.

EURO (*continued*)

5414 Conference on Comprehensive Psychiatric Services and the Community, Peebles, Scotland (24–30 May 1972) R—To consider the implications of the current trend towards care of the mentally disordered in the community wherever possible, rather than in mental hospitals. There were 28 participants (including public health administrators, psychiatrists, general practitioners, social workers, nurses and educators) from 23 countries of the Region and representatives of the International Council of Nurses, the International Council on Social Welfare, the World Federation for Mental Health, the World Federation of Occupational Therapists and the World Psychiatric Association. Provided—six temporary advisers, the cost of attendance of 23 participants, and the services of four staff members.

5415 Study of the documentation on mental health service activities in Europe (1972) R—To tabulate and analyse the data on mental health services collected by a questionnaire and discussed at a symposium in 1970 and prepare it for distribution to all Member States. The document will be issued in English, French and Russian.

5416 Working Group on Data Collection and Classification in Services for the Mentally Retarded, Barcelona, Spain (7–10 March 1972) R—To consider the planning and organization of services for the mentally retarded and the feasibility of collecting data on the totality of the services in a pilot area. There were 10 participants (nine temporary advisers and one participant attending at his government's expense) from nine countries of the Region, and representatives of the International League of Societies for the Mentally Handicapped and the World Psychiatric Association. A consultant was provided.

5418 Working Group on Health Education Programmes concerning Drug Abuse in Young People, Hamburg, Federal Republic of Germany (11–14 April 1972) VD—To consider the content and presentation of health education programmes directed to the prevention of drug abuse by young people. There were 10 participants from nine countries of the Region and representatives of UNESCO, the International Council on Alcohol and Addictions, the League of Red Cross Societies, the World Federation for Mental Health, and the World Psychiatric Association. A consultant was provided.

5420 Training course in mental health epidemiology and statistics, Paris (6–22 March 1972) R—To bring together psychiatrists and statisticians for discussion of problems, with a view to developing a better understanding of how they could work together in the planning and organization of national mental health services. Provided—cost of attendance of 11 participants from 10 countries of the Region.

5425 Working Group on Problems of Deviant Social Behaviour and Delinquency in Adolescents and Young Adults, Helsinki (27–30 June 1972) R—To consider the problem of deviant social behaviour and delinquency in adolescents and young adults and measures for its prevention and control, and to determine, in the light of experience, the areas in which future action or research were likely to be most profitable. There were 11 participants (10 temporary advisers and one participant attending at his government's expense) from nine countries of the Region, and representatives of the United Nations Division for Social Affairs, the United Nations Social Defence Research Institute, the Council of Europe, and Interpol. A consultant was provided.

5436 Conference on the Epidemiology of Drug Dependence, London (25–29 Sept. 1972) R VD—To discuss a number of topics of importance in the epidemiology of drug dependence, with the aims of reaching international agreement on ways of attacking

the problem and of coordinating the activities of different countries. There were 28 participants (27 temporary advisers and one participant attending at his government's expense) from 12 countries and representatives of the Council of Europe and the International Council on Alcohol and Addictions. A consultant was provided.

5438 Working Group on the Role of the Social Worker in the Psychiatric Services, Nice, France (4–7 Sept. 1972) VD—To consider the role of the social worker in mental health activities, taking account of the conditions imposed by trends in manpower and in methods of prevention, treatment and rehabilitation of different types of psychiatric illness. There were 13 participants (12 temporary advisers and one participant attending at his government's expense) from 12 countries of the Region, and representatives of the United Nations Division of Social Affairs, the International Council of Nurses and the International Council on Social Welfare.

5501 Study on child dental health services in Europe (1970; 1972) R—To follow up, by means of information gathered from eight European countries, the survey on child dental health in Europe and provide, in a report, the information needed to determine the conditions required for systematic treatment of children and for effective use of dental manpower. Consultants were provided in 1970 and in 1972 and a meeting of 10 representatives from cooperating countries was held in London from 15 to 17 May 1972 to compare the systems in these countries.

5504 Study on the evaluation of dental health services (1971) R—To ascertain the data being used and the most suitable data for use in analysing statistically the results of work done by national dental health services, and to suggest simple objective methods of evaluation, based on epidemiological and other data. Five European countries participated in the study, the preliminary results of which were used for a working group which met in Oslo in 1971 to discuss the planning and evaluation of dental health services. A report on the study will be published.

5506 Study on the different uses of fluoride in caries prevention (1972) R—To study the use of fluoride and its main effects in the prevention of dental caries, in order to determine the costs, and the manpower required, and the saving in staff time spent on curative work resulting from its use. A meeting of eight temporary advisers from five countries of the Region was held in London on 18 and 19 May 1972 to discuss the material available on the subject in the six countries participating in the study and to arrange for its completion. A report on the study will be published.

6001 Exchange of information on placement, supervision and follow-up of WHO fellows (1968–) R—To continue the exchange of experience between members of national health administrations and regional office staff and enable them to visit countries that have extensive experience in receiving WHO fellows and arranging their placement; and to supervise the placement of trainees from other WHO regions for studies in countries of the European Region.

A seminar was held in Trieste (Italy) from 27 to 29 November 1972, at which national health officers responsible for WHO fellowships programmes in their countries discussed how such programmes could be improved. There were 22 participants from 22 countries of the Region. Staff members from headquarters and the Regional Office for the Eastern Mediterranean attended. Provided—two temporary advisers and the cost of attendance of the participants.

6002 Seminar on the Training of Medical Teachers in Pedagogy, San Remo, Italy (18–22 April 1972) R—To consider the feasibility

of examining medical school teachers in pedagogy and to develop models for the organization and content of relevant training programmes. There were 22 participants from 20 countries of the Region. Provided—a consultant, seven temporary advisers, and the cost of attendance of 16 participants.

6003 Workshop on the Teaching of Social and Preventive Medicine, Edinburgh (5–13 Sept. 1972) R—To assist medical teachers in formulating the objectives of the teaching of social and preventive medicine and in developing experimental teaching programmes. There were 13 participants from 11 countries of the Region. A headquarters staff member attended. Provided—a consultant, seven temporary advisers and the cost of attendance of 11 participants.

6004 Participation in the Fourth World Conference on Medical Education, Copenhagen (25–29 Sept. 1972) R—WHO met the cost of attendance at the Conference of eight participants from three countries of the Region and provided services for Russian interpretation.

6201 Undergraduate education for the health professions (1961–) R—To assist schools for health personnel in introducing new methods in undergraduate education, in exchanging experience and in obtaining information on various aspects of education in the health sciences.

6301 Postgraduate training for the health professions (1965–74) R—To assist in organizing and improving postgraduate training for the health professions.

6401 Course for public health administrators (in Russian), Moscow (15 Oct. 1972–15 July 1973) R—To assist several countries in training medical administrators for key posts, in a one-year postgraduate course. Fellowships were awarded for the 1972–73 course to seven trainees from four countries, and two lecturers were provided for the 1972 part of the course. (It is planned to provide six lecturers for the part held in 1973.)

6402 Postgraduate training in public health (1970–) R—To assist schools of public health and other institutions responsible for postgraduate education in organizing basic, advanced and continuing education in public health and in promoting the use of effective educational methods.

7401 Training in the quality control of drugs (1971–72) R—To provide for the advanced individual training of analytical technicians selected from graduates with long practical experience in the quality control of pharmaceutical preparations.

8102 Study on cancer control (1972–75) R—To review cancer control and initiate follow-up activities in comparative epidemiology.

8201 Establishment of ischaemic heart disease registers (1968–) R—To prepare a simplified registration system for the notification and continued surveillance of ischaemic heart disease in the population of a selected area, with a view to procuring accurate and comparable data on different aspects of the disease and on medical care of patients.

8202 Studies on the prevention of ischaemic heart disease (1968–) R—To follow up previous prevalence surveys, stimulate activities and achieve a better knowledge of the etiology and prevention of ischaemic heart disease.

8203 Training in epidemiological methods in cardiovascular diseases (1968–72) R—To provide facilities for training doctors in epidemiological methods applicable to cardiovascular diseases in view of the shortage, in some countries of the Region, of medical personnel trained in this field.

8204 Study on the evaluation of coronary care (1968–) R—To assess the value and cost to the community of coronary care services by estimating the frequency of cardiac emergencies requiring such services in defined areas, assessing the cost and staffing needs, and evaluating reports on the reduction of mortality.

8205 Training in coronary care (1968–) R—To provide for the individual training of doctors and other health personnel in intensive coronary care and its organization in selected units; and for the participation of lecturers in national courses on coronary care.

8206 Study of the effects of rehabilitation in patients with cardiovascular diseases (1968–) R—To carry out controlled coordinated studies on the effects of rehabilitation in patients with cardiovascular diseases, its possible influence in preventing later incapacity, and factors that may result in a relapse or affect length of life.

8208 Training in rehabilitation of patients with cardiovascular diseases (1968–) R—To provide for training in the rehabilitation of patients with cardiovascular diseases.

8210 Evaluation of the progress of the regional cardiovascular diseases programme (1969–) R—To evaluate the progress of work on cardiovascular diseases and suggest changes in the programme in the light of new advances in the field of cardiology.

8212 Study on cerebrovascular diseases (1971–) R—To develop methods to enable public health authorities to assess the extent of the cerebrovascular disease problem in the community and provide reliable data for planning services for its control. The work on pilot stroke registration schemes, begun in 1971, is being pursued and the activities of centres collaborating in their development is being coordinated by means of *ad hoc* meetings and advisory services.

Three working were held in cooperation with headquarters during the period under review, as follows:

Working Group on Community Control of Stroke and Hypertension, Göteborg (29 Nov.–3 Dec. 1971) — 20 participants (temporary advisers) from 14 countries;

Working Group on Stroke Registers, Copenhagen (8–10 Nov. 1972) — 14 participants (temporary advisers) from 13 countries;

Working Group on Community Control of Hypertension, Geneva (13–16 Nov. 1972) — 22 participants (temporary advisers) from 18 countries.

Representatives from the *Medical Tribune* secretariat attended the meetings in Copenhagen and Geneva.

8401 Trachoma control and prevention of loss of vision (1958–74) UNDP—To provide specialized technical advice on the further development of communicable eye disease control projects in several countries of the Region, and to study the need for general sight-saving programmes in these and other countries.

CS 01 European Conference on Medical Computing, Luxembourg (10–14 July 1972) R—To ascertain the views of Member governments on the future of medical computing in the Region and on the part that should be played by the Organization. There were 24 participants from 19 countries of the Region and a representative of the International Federation for Information Processing. Provided—a consultant, eight temporary advisers and the cost of attendance of one participant.

IC 01 Follow-up of intercountry activities on a national basis (1958–73) R—To assist governments in developing national activities arising out of the intercountry programmes of the European Region.

EURO (*continued*)

OR 02 Training course on operational research in public health (in English), Aberdeen, Scotland (29 Nov.–15 Dec. 1972) R—To train health administrators in the techniques and application of operational research. Provided—six lecturers and fellowships for 10 trainees from 10 countries of the Region. Ten trainees from the United Kingdom attended at the expense of their Government.

SC 01 Participation in seminars and conferences (1959–73) R—To assist with seminars and conferences conducted by the United Nations, specialized agencies, medicosocial organizations and agencies whose work is of special interest to the Regional Office.

SC 02 Preparatory arrangements for conferences (1964–73) R—To make preparations and preliminary arrangements for conferences, seminars, etc., to be held in the following year.

EASTERN MEDITERRANEAN REGION

Afghanistan

1201 (0033) National tuberculosis programme (1958; 1961–) UNDP UNICEF—To implement a national tuberculosis control programme integrated into the basic health services.

1801 (0064) Smallpox eradication (1967–75) R VS—To achieve eradication of smallpox through mass vaccination and the operation of a reporting and containment/surveillance system.

2001 (0011) Malaria eradication programme (1956–74) R UNICEF—To eradicate malaria from Afghanistan north of the Hindu Kush, and to continue antimalaria “holding” operations to conserve the gains achieved south of this mountain range, with the ultimate objective of achieving the eradication of malaria from the whole country.

3001 (0066) Environmental health (1966–74) R—To establish an environmental sanitation unit in the Ministry of Public Health and plan and implement a long-term programme of community water supply, waste disposal and general sanitation.

3201 (0057) Water supply, sewerage and drainage for Greater Kabul (1966; 1968–69; 1971–74) UNDP—To make a detailed study of the water supply, sewerage and drainage situation in Greater Kabul and formulate a master plan and a phased programme of development.

4001 (0059) Development of basic health services (1965–75) R UNICEF—To establish, throughout the country, basic health services into which the malaria eradication services may be integrated when the consolidation phase of the eradication programme is well advanced; and to strengthen the provincial health administration so as to secure adequate supervision of the basic health services personnel.

4201 (0076) Histopathology department, Avicenna Hospital (1972–73) R—To establish a histopathology department at the Avicenna Hospital, Kabul, for training students and conducting routine histopathological work.

4202 (0031) Institute of Public Health, Kabul (1956–58; 1961–) R UNICEF—To develop the Institute of Public Health for service, research and training of public health workers and to reinforce the teaching of sanitary engineering subjects in the undergraduate civil engineering course.

4401 (0035) Nursing advisory services (1957–74) UNDP—To strengthen nursing administration at national and local levels, and develop and coordinate nursing and midwifery education and services.

4402 (0068) Nursing administration and education (1967–75) R—To improve nursing services administration in order to provide effective nursing care of patients.

4701 (0067) School of Radiography (1969–) R—To train X-ray technicians at the School of Radiography, Avicenna Hospital, Kabul.

4901 (0080) Advisory services in vital and health statistics (1971–) R—To develop the national vital and health statistical services and train the necessary staff.

4902 (0083) Infant and childhood mortality survey (1971–) UNFPA—To organize a survey on infant and childhood mortality that will provide information on the magnitude of the problem, the factors affecting it, and the impact of specific public health measures; to test statistical methods for collecting information on infant and childhood mortality in the absence of or as a supplement to a vital statistics system; and to train staff for the project.

5101 (0071) Maternal and child health, Kabul (1971–74) UNDP—To reorganize and strengthen comprehensive services for maternal and child health care, including family planning, and to provide refresher and orientation courses in maternal and child health for professional and auxiliary health personnel.

6201 (0100) Medical education (1952–) R—To strengthen departments of the faculties of medicine of the Universities of Kabul and Nangarhar, develop teaching programmes and train staff.

7401 (0079) Pharmaceutical quality control (1972–) R—To establish a division of pharmacy and medical supplies in the Ministry of Public Health; and to develop the quality control laboratory for the analysis and assay of pharmaceutical preparations and administrative control measures such as legislation, licensing and registration of locally manufactured and imported drugs.

Cyprus

3301 (0018) Sewage disposal (1971–) R—To study environmental health conditions, especially as regards waste-water and solid wastes disposal, with a view to their improvement.

4201 (0015) Public health laboratory (1970–74) R—To establish a cancer register and raise the standard of performance of the histopathology department.

4301 National health services (July 1972) R—A consultant assisted in exploring the possibilities of introducing a national health service and in reviewing the social, financial and technical implications.

7401 (0023) Pharmaceutical quality control (1967–69; 1971–) R—To develop the laboratory for the quality control of pharmaceutical preparations, and to provide the national pharmaceutical services with an efficient control system comprising legislation, and inspection, registration and licensing of pharmaceutical products.

Democratic Yemen

1201 (0001) Tuberculosis control (1971–) R UNICEF—To implement a comprehensive national tuberculosis control programme, integrated into the general health services in the provinces and with a specialized service at the central level.

Democratic Yemen (continued)

1801 (0011) Smallpox eradication (1969-74) R—To carry out mass vaccination against smallpox and to organize and intensify reporting and surveillance, in order to keep the country free from smallpox.

2001 (0008) Malaria control (1969-) R—To carry out anti-malaria measures and coordinate the development of the malaria service with that of the rural health services.

2401 (0010) Parasitic disease survey (March-May 1972) R—A consultant made a survey of the prevalence of parasitic diseases, advised on control methods and helped to train personnel in laboratory examinations and control measures.

4001 (0007) Public health advisory services (1968-) R—To strengthen the administration of the health services and develop health programmes.

4002 (0017) Soil and water utilization and conservation in the Wadi Tuban watershed area (health aspects) (Dec. 1971-Feb. 1972) UNDP/FAO—A consultant made an epidemiological survey of health and sanitary conditions in the project area and formulated recommendations for the prevention and control of health hazards, particularly those related to waterborne diseases.

4201 (0015) National health laboratory (1971-76) R—To establish a central public health laboratory that will serve as the nucleus for the development of national health laboratories.

6101 (0006) Institute of Health Manpower Development, Aden (1970-) UNDP—To establish an institute for training the technical personnel (nursing staff and middle-grade personnel of various categories) required for the health services.

Egypt

1201 (0079) BCG vaccine production, Cairo (1972-74) UNDP—To establish a laboratory for the large-scale production of freeze-dried BCG vaccine.

1601 (0041) Shigella and Salmonella survey (1969-) R—To establish a reference centre for the classification of *Shigella* and *Salmonella*.

1901 (0063) Virus research, training and production centre, Agouza (1966-) UNDP—To set up a vaccine production centre for poliomyelitis, measles and other virus vaccines.

2001 (0023) Malaria eradication programme (1957-) R—To carry out studies on malaria in the country, with particular emphasis on the bionomics of the vectors and their susceptibility to insecticides, and to make studies of spraying equipment.

2101 (0049) Schistosomiasis control pilot project and training centre (1961-) R UNDP UNICEF—To test measures for controlling schistosomiasis, so as to find those cheapest and most effective under conditions in the country. The project serves as a field demonstration and training centre for the Region.

3301 (0059) Cairo sewage disposal (1969-72) R—To improve the operation and management of the Zenein sewage treatment plant and of the Cairo sewerage system in general. Supplies and equipment for laboratory control were provided, and five fellowships were awarded.

3701 (0081) Central agricultural pesticides laboratory, Cairo (health aspects) (1971-73) UNDP/FAO—To evaluate the mammalian toxicity of new pesticide formulations, develop

application techniques and procedures and determine the measures needed to protect the health of agricultural workers and of the general population.

4002 (0064) Health component in Lake Nasser Development Centre (1966-) UNDP/FAO—To examine the public health problems arising from environmental changes associated with the comprehensive Lake Nasser development scheme in the Aswan region.

4201 (0044) Concentrated sera production (1972-) R—To establish a unit for the production and purification of concentrated sera at the Agouza laboratories, Cairo.

4301 (0040) Intensive care unit, Alexandria University Hospital (1970-) R—To develop an intensive care unit at the Hospital.

4303 (0078) Intensive care units (1972-) R—To plan, organize and manage intensive care units in the large hospitals and train the necessary staff.

4401 (0050) Postbasic nursing education (1961-72) UNDP UNICEF—To assist in strengthening nursing education and services and to prepare qualified nurses as teachers and administrators. Provided—nine educators for a total of 204 months, fellowships, supplies and equipment.

The project was based in the Ahmed Maher Hospital and its School of Nursing, Cairo. In addition to the regular nursing education programme, courses, lasting from one to six months, were given for various categories of health personnel. These courses were based on local needs, and included administration, teaching and supervision, and postbasic preparation in a number of nursing specialties. In all, 297 nurses received training.

As from 1968 the WHO nurse educators were seconded to the High Institute of Nursing, Cairo University (project Egypt 4402), but continued to provide *ad hoc* assistance to the project.

4402 (0060) High Institute of Nursing, Cairo University (1965-75) R—To develop a basic four-year degree programme in nursing, designed to prepare nurses for leading posts in nursing service and educational programmes.

4801 (0058) Physical therapy department, Poliomyelitis Institute, Cairo (1967-) R—To develop the department.

4901 (0071) Health data processing (1970-) R—To improve the use made of computers for vital and health statistics and research, and to train national staff.

5101 (0080) Prophylaxis of recurrence of rheumatic fever in schoolchildren (1972-) R—To prevent and control rheumatic fever in schoolchildren.

5501 (0074) Fluoridation of water (1970; 1972-) R—To carry out fluoridation of public water supplies where the fluoride content is below the desirable level, starting in certain districts of Alexandria.

5601 (0035) Nutrition Institute (1972-73) UNDP UNICEF (FAO)—To continue the development of the Nutrition Institute, Cairo.

6201 (0100) Medical education (1970-) R—To develop undergraduate and postgraduate medical education, and scientific research, in the medical schools.

6401 (0027) High Institute of Public Health, University of Alexandria (1956-) R—To develop the Institute, which provides postgraduate training in public health for Egyptian graduates and WHO fellows from other countries of the Region.

7401 (0048) Pharmaceutical quality control (1970-) R—To develop specific aspects of drug control for locally manufactured and imported pharmaceutical preparations, and to carry out research and train specialists in this field.

8101 (0065) Cancer Institute, Cairo (1967-72) R—To establish a statistical service for the collection of epidemiological information on cancer at the Cancer Institute, develop techniques for the early detection and treatment of cancer, and undertake research and training of personnel in various aspects of cancer control. Consultants advised on surgery and hormonal treatment of cancer and on radiation dosimetry in isotope teletherapy, and made recommendations for the further development of the Institute. Supplies and equipment were provided and six fellowships were awarded.

8401 (0077) Neurosurgical centre, Shoubra Hospital, Cairo (1971-74) UNDP—To establish a neurosurgical centre in Shoubra Hospital, Cairo, and develop satellite centres in other governorates.

8801 (0076) Centre for allergic diseases of the respiratory system (1971-) UNDP—To establish a centre for allergic diseases of the respiratory system.

9601 (0029) Family planning (1970-) UNFPA—To implement the health component of the national family planning programme and train technical personnel for the programme.

Ethiopia

1001 (0024) Advisory services in epidemiology (1966-) UNDP—To plan, develop and operate epidemiological services at all levels of the health services.

1201 (0006) Tuberculosis control (1959-74) UNDP UNICEF—To implement a comprehensive national tuberculosis control programme, integrated into the provincial health services.

1801 (0042) Smallpox eradication (1968-) R VS—To achieve the eradication of smallpox through a system of reporting and surveillance/containment operated with the cooperation of the health services.

2001 (0039) Malaria eradication training centre (1959-) R—To train various categories of personnel for the malaria eradication programme.

2002 (0040) Malaria eradication programme (1967-) R (USAID)—To eradicate malaria from those areas in which technical and administrative conditions ensure its feasibility.

2101 Schistosomiasis control (Sept.-Nov. 1972) R—A consultant carried out a malacological survey, including studies on the distribution and bionomics of the snail intermediate hosts of schistosomiasis, made studies on various trematode infections in domestic animals of economic importance, formulated a long-term plan for control measures, and trained national personnel in laboratory techniques and control methods.

3001 (0036) Environmental health services (1967-) R—To plan and administer a national environmental health programme.

3002 (0046) Public and environmental health control, Awash valley (1971-74) UNDP—To review the epidemiological situation and assess the health and environmental hazards in the area covered by the Awash valley development programme, to plan a network of basic health services and to improve sanitary facilities, especially as regards community water supplies, disposal of domestic and industrial wastes and control of schistosomiasis.

3201 (0032) Community water supply (1967-) UNDP—To investigate the design and supervise the construction of community water supplies in the small towns.

4001 (0025) Development of provincial health services (1962-68; 1970-75) R UNICEF—To establish a network of integrated health services, initially in one province; to reorient the work of provincial health departments and health centres towards the provision of integrated preventive and curative services; and to build up a system of effective supervision within the framework of health services at provincial level.

4101 (0037) Health planning (1968-) UNDP—To plan and develop national health services and coordinate health programmes as part of the national five-year development programme.

4201 (0048) National health laboratory service (1972-) R—To establish a national health laboratory service by strengthening and modernizing the Imperial Central Laboratory and Research Institute and expanding the services to cover the provinces; and to train the necessary personnel.

4301 (0035) Hospital planning and administration (1970; 1972-) R—To develop the hospital and medical care services.

4901 (0003) Advisory services in vital and health statistics (1966-74) UNDP—To strengthen the health statistical unit in the Ministry of Public Health, improve the collection, compilation and publication of vital and health statistical data and train statistical personnel of various categories at central and provincial levels.

5101 (0053) Maternal and child health services (Nov. 1971-Jan. 1972) R—A consultant assisted in reviewing maternal and child health care problems and services and submitted recommendations for future work in this field.

6201 (0100) Medical education (1964-) R—To develop the medical faculty at the Haile Sellassie I University in Addis Ababa.

6401 (0009) Public Health College and Training Centre, Gondar (1954-) R—To train health personnel to staff the expanding health services, particularly in rural areas.

7401 (0044) Pharmaceutical services (1971-) R—To establish a division of pharmacy and medical supplies in the Ministry of Public Health; and to develop the quality control laboratory for the analysis and assay of pharmaceutical preparations and administrative control measures such as legislation, licensing and registration of locally manufactured and imported drugs.

Iran

3001 (0065) Teaching of sanitary engineering, Pahlavi University, Shiraz (1968; 1970; 1972-) R—To develop a programme of sanitary engineering education and research, initially at undergraduate level, at the University.

3301 (0070) Pre-investment survey of sewerage needs and facilities in Teheran (1968; 1970-) UNDP—To undertake a pre-investment survey for sewerage and storm drainage in the Greater Teheran area and to draw up master plans and first-stage feasibility studies to assist in securing investment for construction. The survey will also cover the treatment and re-use of waste water for agricultural purposes.

4001 Health services development (May-July 1972) R—A consultant assisted in carrying out a study of the decision-making process in the Ministry of Health.

Iran (continued)

4401 (0049) High Institute of Nursing, Teheran (1967-74) UNDP—To develop basic nursing education at university level.

4402 (0052) Postbasic nursing education (1967-77) R—To develop a two-year postbasic programme leading to a degree of Bachelor of Science in nursing at the Department of Nursing, College of Arts and Sciences, Pahlavi University, Shiraz.

4801 (0047) Rehabilitation of the physically handicapped (1969-) R—To train personnel required for the development of rehabilitation services throughout the country at the school of physical therapy, University of Teheran, and the Shafa Yahayaian Rehabilitation Hospital.

6201 (0100) Medical education (1971-) R—To develop training and research work in the medical faculties of the seven universities, particularly in the basic medical sciences and in public health, and to establish the radiotherapy department at the University of Isfahan.

6401 (0043) Postgraduate education in public health (1964-74) R—To develop postgraduate training in public health and allied fields at the faculty of public health, University of Teheran.

7401 (0053) Laboratory for pharmaceutical quality control (1966-74) R UNDP—To develop the quality control laboratory for the analysis and assay of pharmaceutical preparations, chemicals and dependence-producing drugs, revise legislation governing the trade, and train local staff in modern techniques of drug analysis.

8101 (0029) Cancer control (1967-74) R—To develop the programme of the Research Department of the Teheran Cancer Institute.

9601 (0080) Health aspects of family planning (1971-) UNFPA—To plan and implement the health components of the national family planning programme, and to train technical personnel for the programme.

Iraq

2001 (0011) Malaria eradication programme (1957-) R UNICEF—An extension of the malaria control programme with which WHO has assisted since 1952.

3201 (0054) Rural water supply programme (1968-69; 1971-73) UNDP—To appraise the community water supply situation in the rural areas, prepare a master plan for rural water supplies and establish a national rural water authority.

4001 (0049) Comprehensive basic health services: Training (1964-75) UNDP UNICEF—To provide in-service training for professional and auxiliary personnel of the rural health services and field training to undergraduate medical and nursing personnel.

4201 (0061) Public health laboratory services (1969-75) R—To develop microbiological diagnostic facilities adequate for the needs of the curative and preventive health services and also to develop the production of vaccines.

4301 (0040) Hospital services administration (1966-) R—To strengthen the administration of the Medical City Teaching Hospital, Baghdad, plan and organize nursing services, establish an intensive care unit and a central sterile supply department, and develop food and dietetics services.

4401 (0037) College of Nursing, Baghdad (1962-74) R—To develop a university nursing education programme to prepare nurses for leading posts in nursing service administration and in nursing education.

6201 (0100) Medical education (1971-) R—To strengthen the departments of basic medical sciences and public health at the colleges of medicine in Baghdad, Basra and Mosul.

7401 Poison information centre (1972-76) To establish a poison information and treatment centre, and to organize procedures for dealing with cases of poisoning, wherever they occur.

8101 (0043) Cancer control (1968-) R—To develop the radiotherapy department of the Institute of Radiation and Nuclear Medicine, Baghdad, and to train radiotherapy technicians.

9601 (0068) Maternal and child health and family health (1970-74) UNFPA—To develop maternal and child health and family planning activities within the health services, organize the family planning programme, with emphasis on the maternity-centred approach, and train the necessary personnel.

Israel

3401 (0043) National survey on refuse disposal (1967-70; 1972-73) R—To review the situation as regards solid waste disposal, and to draw up and implement a national refuse disposal plan.

4401 (0007) Nursing education (1965-74) R—To prepare plans for the further development and strengthening of nursing education and services.

4701 (0039) Radiation protection (1970-) R—To improve the dosimetry in therapeutic X-ray installations and increase the protection of personnel occupationally exposed to ionizing radiation by the introduction of thermoluminescent dosimeters; to train hospital physicists; and to carry out surveys of environmental radioactivity in the Central Laboratory for Prevention of Air Pollution and Radiation Hazards at the Tel Hashomer Government Hospital.

6201 (0100) Medical education (1957-) R—To develop teaching and research at the medical faculties.

8101 (0050) Cancer control (cytopathology) (1972-74) R—To develop cancer control services and organize a course in the techniques of exfoliative cytology for the early detection of cancer.

8201 (0045) Coronary care unit (1969-73) R—To develop the coronary care unit of the Tel Hashomer Government Hospital for use as a training centre.

Jordan

1201 (0029) Tuberculosis control (1963-74) R—To formulate and implement a comprehensive national tuberculosis control programme, integrated in the general health services.

2001 (0006) Malaria eradication programme (1958-) R UNDP

3301 (0035) Municipal waste disposal, Amman (1968-74) UNDP—To provide for assistance to the Amman municipality in operating and maintaining the new sewage works and in providing house connexions to the water mains and sewers; to complete the study of solid waste disposal; and to develop the water and sewage unit in the Ministry of Municipal and Rural Affairs.

4201 (0009) Public health laboratory (1971-) R—To set up an oncology register in the public health laboratory services, develop the production of bacterial vaccines, and establish a virology diagnostic section. The former project Jordan 0023 (Vaccine production) has been integrated into this project.

4301 (0034) Hospital planning and administration (1971-) UNDP—To organize and develop a hospital administration unit in the Ministry of Health and review the planning of facilities and the organization and management of hospitals with a view to improving the medical care services.

4302 (0042) Survey of thermal waters (April-May 1972) R—A consultant made chemical analyses of the Azrak mineral water resources in order to ascertain the possibilities of their use for curative purposes.

4401 (0002) Nursing education (1965-75) UNDP—To strengthen nursing services and develop professional and auxiliary nursing education programmes.

4801 (0028) Rehabilitation services (1967-) R—To develop the rehabilitation centre and introduce modern methods of physical therapy; also to plan and develop training programmes for physical therapists and establish a prosthetic workshop.

6101 (0033) Health training institute (1966-70; 1972-) R—To establish and develop an institute for training multipurpose health personnel for staffing health centres and dispensaries in rural areas.

6201 (0100) Medical education (1971-) R—To strengthen the Faculty of Medicine and Pharmacy of the University of Amman, particularly as regards the teaching of community medicine and the further training of teachers in their subjects and in educational science and methodology.

Kuwait

4401 (0004) Nursing advisory services (1966-67; 1969-75) R FT—To develop nursing education and nursing services, define standards of nursing care, and organize in-service education programmes for nursing personnel.

5201 (0019) Pollution control in the working environment (1972-73) UNDP/ILO—To carry out an occupational hygiene programme, giving particular attention to the control of pollution in the working environment; and to evaluate the effects on health of the population, including workers, of air and water pollution and implement measures for its control.

Lebanon

4002 Hydro-agricultural development (health aspects) (Aug. 1972) R—A consultant analysed a mineral water source in the Sammakieh region, northern Lebanon, for chemical composition and possible radioactivity.

4201 Public health laboratory (July-Aug. 1972) R—A consultant made a study of the poliomyelitis situation and of trends in that situation since 1969 as well as studies of the vaccination programmes carried out between 1969 and 1972 and of the work of the virology unit of the central laboratory, and submitted recommendations for checking the efficacy of the vaccine used and for the general organization of the antipoliomyelitis campaign.

4301 (0041) Blood bank (1963; 1965-66; 1970-) R—To develop the blood bank.

4302 (0021) Hospital administration (1971-73) R—To improve the administration of the hospital services.

4401 (0010) Nursing education (1964; 1968; 1971-) R—To organize nursing education and nursing services at the national level.

4801 (0031) Rehabilitation of the physically handicapped (1963-) R—To establish a physical therapy department in the government hospital, Beirut, and reorganize an orthopaedic workshop in a new prison on the outskirts of the city.

6401 Training in public health (March 1972) R—In connexion with refresher courses for medical officers of the health services, a consultant gave a series of lectures on epidemiology, health indicators, and health economics.

7401 (0044) Pharmaceutical services (1967-74) R—To develop pharmaceutical services. The work includes the organization of a pharmacy department in the Ministry of Public Health, the planning and implementation of measures for quality control of pharmaceutical preparations, and the establishment of a laboratory for this purpose.

Libyan Arab Republic

1001 (0034) Epidemiological services (1971-) R—To establish in the Ministry of Health a department of epidemiology with the functions of collecting, analysing and interpreting data on diseases of public health importance and applying modern techniques for their control or eradication.

1201 (0022) Tuberculosis control (1963-73) FT—To implement a national tuberculosis control programme.

1701 (0006) Communicable eye disease control (1969-73) FT—To set up, within the public health infrastructure, services for maintaining the control of communicable eye diseases on a permanent basis.

3001 (0030) Environmental health services (1968-73) FT—To develop a national environmental health programme and environmental health services, including water and sewerage laboratories in the Ministry of Health and in the three provinces.

4201 (0037) Public health laboratory service (1972-) R—To establish a national health laboratory service, starting with a central public health laboratory in Tripoli.

4402 (0008) Nursing education, Benghazi (1967-74) R—To develop the nursing school in Benghazi.

5102 (0012) Maternal and child health, Benghazi (1965-72) FT—To train auxiliary maternal and child health staff for maternal and child health and basic health centres in the eastern province.

5103 (0021) Maternal and child health advisory and supervisory activities (1965-72) FT—To improve and expand maternal and child health work as part of the general health services, increase the efficiency of maternal and child health workers, and strengthen and coordinate the organization, administration and operation of all services related to the care of mothers and children.

5104 (0038) School health services (May-June 1972) R—A consultant made a review of school health services and health education and advised on the organization, development and strengthening of the services.

Libyan Arab Republic (continued)

5601 (0020) Food and nutrition services (1965-71) FT (FAO)—To define the main food and nutrition problems in the country, establish services for a coordinated food and nutrition programme, and train medical and auxiliary personnel in nutrition. Provided—a senior nutrition adviser, a laboratory technician, a public health nurse, a 16-month fellowship, and supplies and equipment.

Studies in maternal and child health centres and limited field surveys revealed that protein-calorie malnutrition and marasmus in preschool children and nutritional anaemias among women and children were the main problems. Infections including diarrhoeal diseases and parasitoses, together with bad dietary habits, were found to be responsible for the wide prevalence of malnutrition. An extensive school feeding programme has been implemented in recent years. A Nutrition Division was established in the Ministry of Health, and a National Food and Nutrition Council was set up in September 1970 with the Minister of Health as Chairman. Among its first decisions was the establishment of a plant for the production of a good weaning food mixture to be subsidized for the benefit of low-income families. A joint FAO/WHO/UNICEF mission studied the feasibility of such production, and the Government indicated its willingness to finance it. Several studies on hospital food and dietary services were conducted and recommendations made on their organization and improvement. Two candidates for posts in the new Nutrition Division of the Ministry of Health were trained under the project.

6101 (0007) Health Training Institute, Benghazi (1955-75) FT—To train health auxiliaries and sanitarians, radiographers, laboratory technicians and male nurses for hospital and health centres, particularly in rural areas.

8101 (0039) Cancer control (1972-) R—To plan a radiotherapy department for the treatment of cancer.

Oman

2001 (0001) Malaria control (1972-) R—To carry out epidemiological and malaria surveys and measures for the control of malaria and other parasitic diseases.

Pakistan

1201 (0050) Tuberculosis control (1962-) R UNDP UNICEF—To implement a national tuberculosis control programme integrated into the general health services.

1801 (0041) Smallpox eradication (1967-75) R VS—To implement a smallpox eradication programme comprising mass vaccination, with concurrent assessment, and the organization and intensification of surveillance activities and a maintenance and containment system.

2001 (0036) Malaria eradication programme (1961-) R (USAID)

3001 (0034) Teaching of sanitary engineering, Lahore (1968-) R UNICEF—To strengthen the postgraduate sanitary engineering course at the University of Engineering and Technology, Lahore.

3201 (0054) Community water supply and rural sanitation (1964-74) R—To develop the organization and management of community water supply programmes and study their technical, legal and financial aspects; and to improve rural sanitation.

4201 (0048) National health laboratories, Islamabad (1964-) R—To establish national health laboratories in Islamabad, with a view to making them reference laboratories for the whole country.

4801 (0042) Occupational therapy workshop (1970-) R—To reorganize the work of the occupational therapy unit of the Department of Physical Medicine and Rehabilitation, Jinnah Postgraduate Medical Centre, Karachi, and to improve the orthopaedic workshop.

5201 (0066) Occupational health (1969-70; 1972-) R—To develop a department of occupational health in the Institute of Hygiene and Preventive Medicine, Lahore, for teaching and research.

5601 (0038) Nutrition Institute, Islamabad (1967-74) R UNICEF (FAO)—To organize a Nutrition Institute at Islamabad and promote nutrition programmes and services.

6402 (0011) Institute of Hygiene and Preventive Medicine, Lahore (1966-) R—To develop postgraduate teaching in public health at the Institute.

7401 (0071) Pharmaceutical quality control (1967-74) R—To develop services for the quality control of pharmaceutical preparations, both locally manufactured and imported, through the establishment of a central laboratory and the training of staff in modern techniques of drug testing and analysis.

9601 (0079) Family planning (1970-) UNFPA—To plan and implement the health aspects of the national family planning programme and to train technical personnel for the programme.

Qatar

6101 (0002) Training of health personnel (1969-) R—To train auxiliary health personnel, including assistant sanitarians, assistant male nurses, laboratory assistants and others from Qatar and neighbouring countries for staffing health services and hospitals; also to develop in-service and refresher training of health personnel already in government employment.

Saudi Arabia

1201 (0013) Tuberculosis control (1963-) R—To implement a national tuberculosis control programme.

1801 (0030) Smallpox eradication (1968-74) R—To carry out mass vaccination against smallpox and intensify reporting and surveillance, in order to keep the country free from smallpox.

2001 (0004) Malaria pre-eradication programme (1963-) R—To build up the technical, administrative and operational facilities for a control programme as a step towards malaria eradication, and at the same time to develop the rural health services, so that they may provide efficient support to the control and eventual eradication operations.

3001 (0037) Irrigation development in the Wadi Jizan (1972-73) UNDP/FAO—To survey the health situation in the area served by the new irrigation system, with a view to the phased development of local health services.

3002 (0038) Sanitary engineering and municipal programming (1963-75) FT—To develop the municipal environmental health programmes, especially as regards water supplies, disposal of sewage and other wastes, housing, and town planning; and to organize an environmental engineering service for the purpose in the Ministry of Interior.

4001 (0023) Public health advisory services (1962-63; 1967-) R—To improve the administration of the public health services and the planning, coordination, evaluation and follow-up of health programmes.

4002 (0043) Centre for training and applied research in community development (1972-74) UNDP/UN—To establish a centre for training community development workers and conduct research into methods of promoting community responsibility and facilitating socioeconomic change. (WHO assists in the study of community health problems and in incorporating health components in the centre's training programmes and advises on community health services.)

4201 (0007) Public health laboratory services (1959-) R FT—To provide the country with adequate national health laboratory services, starting with a central public health laboratory in Riyadh.

Somalia

1201 (0011) Tuberculosis control (1960-74) R UNDP UNICEF—To implement a comprehensive national tuberculosis control programme, integrated into the basic health services.

1801 (0019) Smallpox eradication (1967-74) R VS—To carry out mass vaccination against smallpox and intensify reporting and surveillance in order to keep the country free from smallpox.

2001 (0002) Malaria pre-eradication programme (1962-) R UNDP—To coordinate the development of the national malaria service and that of the rural health services, and to carry out malaria control measures as a step towards malaria eradication.

4001 (0013) Basic health services (1962-64; 1969-75) R UNICEF—To develop an integrated basic health service and a rural demonstration area to be used for the training of health personnel.

4201 (0025) Public health laboratory services (1966-) R—To develop sound technical methods for laboratory investigation and to provide training facilities, including in-service training for all grades of technical staff.

4301 (0020) Organization of medical care (1962-) R—To establish and improve medical care services in the northern provinces, giving particular attention to surgery, including the training of operating theatre staff.

4302 (0029) Training centre for the repair and maintenance of medical equipment (1972-74) R—To establish a centre under the Ministry of Health and a countrywide service for the repair and maintenance of medical equipment; and to train the necessary staff.

4401 (0015) Nursing education (1961-) R—To strengthen the nursing and midwifery services through provision of a three-year diploma course at the nursing school in Hargeisa, followed by a one-year programme in midwifery for graduate nurses.

6101 (0008) Health Training Institute (1959-75) R UNICEF—To train various categories of health auxiliary personnel, and provide in-service training and refresher courses.

UNICEF 0002 Development of basic health services (July-Aug. 1972) R UNICEF—A consultant reviewed the development of the basic health services, including the work carried out under the programmes for tuberculosis control and for improvement

of water supplies and sanitation, and the various training programmes receiving aid from UNICEF and WHO; and made suggestions regarding possible future UNICEF and WHO assistance.

Sudan

1301 (0012) Leprosy control (1972-) R—To establish a pilot demonstration area for testing the practicability of simple methods for leprosy control, and, using the experience gained, to draw up and implement a leprosy control programme, integrated into the basic health services, in areas where it is epidemiologically justified and economically feasible.

1801 (0028) Smallpox eradication (1967-75) R VS—To carry out a smallpox eradication programme including mass vaccination and a system of reporting and surveillance/containment.

2001 (0006) Malaria control programme (1963-) R—To build up the technical, administrative and operational facilities for a control programme as a step towards malaria eradication, and at the same time to develop the rural health services, so that they may provide efficient support to the antimalaria operations.

2002 (0032) Malaria eradication training centre (1963-) R—To train staff for the malaria service, and to provide training in antimalaria measures to staff of the general health services.

2201 (0026) Onchocerciasis control (1963-73) R—To carry out periodic surveys of onchocerciasis infection in the main section of the Nile north of Khartoum and in Bahr el Ghazal and Equatoria Provinces; to develop a programme for prevention and control of the disease; and to train personnel.

2401 (0050) Mycetoma survey (1969-73) R—To define the extent of the mycosis problem, teach diagnostic techniques, and stimulate the interest of medical and health officers in case-finding, diagnosis, treatment and control of mycoses.

3001 (0027) Sanitary engineering course, University of Khartoum (1967-73) R—To improve the teaching of sanitary engineering subjects to students of civil engineering at the University of Khartoum, to provide additional optional courses for senior students and ultimately to organize a postgraduate course in sanitary engineering.

3002 (0036) Environmental health (1965-72) R—To plan and develop a national environmental health programme and to organize, in the Ministry of Health, a sanitary engineering service to undertake it. Provided—a sanitary engineer, a sanitary chemist, a short-term consultant, and a fellowship.

A Division of Environmental Health was set up in the Ministry of Health, and a scheme for the establishment of a board to examine environmental health projects was prepared which was approved by the ministries and organizations concerned. Analyses of industrial wastes were carried out in Khartoum North and recommendations made for pre-treatment. Work also started on the sewerage system for this district. Demonstration projects were planned and designs of sewerage installations were drawn up for various public buildings, including public hospitals. Surveys of environmental sanitation conditions were carried out in much of the country, and a report and recommendations prepared. In particular, a national programme of inspection of water supply systems started and the recommendations of the project staff were submitted to the competent authorities. Courses on water quality control were organized for health officers and inspectors.

The activities begun under this project are continuing under the supervision of the sanitary engineers in the Division of Environmental Health, who were trained with the assistance of WHO.

Sudan (*continued*)

3201 (0045) Community water supply in rural areas (1968-72) R—To provide a safe piped water supply to Rahad town and drinking-water from *hafirs* and boreholes throughout the rural area, and to solve general problems of rural water supply. Provided—a water supply engineer, and the services of a sanitary engineer from project Sudan 3002 (Environmental health).

From October 1968 to February 1971 the engineer assisted in the revision of earlier plans for the Rahad reservoir, in work on the construction of the Rahad dam, in the planning and implementation of other water supply schemes by the Rural Water Supply and Development Corporation, and in research at the University of Khartoum on the utilization of water from *hafirs*. The estimates for the Rahad reservoir were considerably reduced by the new plans avoiding the re-routing of the main railway line. The completed dam gives the reservoir a capacity of 56 million cubic metres, which is adequate for the valley's drinking-water and irrigation requirements. Developments to supply villages further down the valley proceed according to capabilities for financing. After the departure of the project engineer, the sanitary engineer from project Sudan 3002 supervised the terminal activities, with particular attention to research on water use.

4003 Public health advisory services, southern region (1972-) R UNICEF—To strengthen the planning, organization and administration of the health services in the southern region.

4201 (0035) National public health laboratory service (1969; 1971-76) UNDP—To establish a national public health laboratory service.

4701 (0037) Training of X-ray technicians (1970-74) R—To train X-ray technicians from Sudan and neighbouring countries.

4901 (0038) Advisory services in vital and health statistics (1970-74) R—To strengthen the vital and health statistics unit in the Ministry of Health, develop a vital and health statistics system, and train staff.

5101 (0039) Teaching of paediatrics (1966-73) R UNICEF—To strengthen teaching and research work in the Department of Paediatrics, Faculty of Medicine, University of Khartoum.

5201 (0014) Occupational health (1969-74) R—To develop the division of occupational health and draw up an occupational health programme.

5601 (0020) Applied nutrition programme (1966-) UNDP/FAO UNICEF—To develop nutrition services and programmes that will contribute to improving the nutritional status of the population.

6201 (0100) Medical education (1971-) R—To develop medical education at undergraduate and postgraduate levels.

7401 (0034) Pharmaceutical quality control (Jan.-April 1972) R—In February 1972 a consultant advised on the pharmaceutical industry in Sudan and on the services for quality control of pharmaceutical preparations, including staff requirements and training needs. In April 1972 another consultant assisted a special commission of officials of the Ministry of Health and representatives of the Medical Council to review the Sudan National Formulary. Supplies were also provided under the project, which began with the visit of a consultant in 1962 to assist in planning the development of the drug control laboratories.

Syrian Arab Republic

1001 (0061) Advisory services in epidemiology (1972-74) R—To set up, in the Ministry of Health, a department of epidemiology for the control or eradication of the most prevalent communicable and noncommunicable diseases.

1201 (0045) Tuberculosis control (1965-) R UNICEF—To implement a national tuberculosis control programme.

1701 (0020) Communicable eye disease control (1966-) R UNDP—To carry out a study of the epidemiology of trachoma and related eye infections, develop methods for their control, train personnel, and set up services, within the public health services, for maintaining the control programme permanently and extending it.

2001 (0002) Malaria eradication programme (1956-) R UNDP

3001 (0039) Development of the Technical Health Institute (1971-76) UNDP—To develop the Institute in order to provide trained health personnel of different categories for the health services and improve the technical standards of health workers.

4002 (0059) Euphrates pilot irrigation project (health aspects) (Dec. 1971-Feb. 1972) UNDP/FAO—A consultant advised on the public health engineering aspects of the irrigation development scheme in the project area and made recommendations on water supply and waste disposal facilities for a pilot area comprising 14 villages.

4201 (0030) Public health and endemic diseases laboratory (1959-) R—To develop the services of the public health and endemic diseases laboratory, and particularly the food microbiology section.

4401 (0037) Nursing education, Damascus (1960-75) R—To develop a pattern of nursing education that will provide graduate nurses to meet the needs of the health services.

5101 School health services (Nov.-Dec. 1972) R—A consultant advised on and assisted in the preparation of a long-term programme for the strengthening and development of school health services, including training of personnel.

6201 (0100) Medical education (1972-) R—To develop medical education, giving special attention to improving teaching of the basic medical sciences and community medicine and to the further training of teachers in their subjects and in educational science and methodology.

6202 (0047) Community-oriented education, Faculty of Medicine, Aleppo (1966-72) UNDP—In 1966 a WHO consultative group helped to draw up a request for UNDP assistance in establishing a Faculty of Medicine at the University of Aleppo. The Faculty enrolled its first students in 1967. Teachers in physiology (from 1968), anatomy (from 1969), pathology (from 1970) and biochemistry (from 1971), as well as consultants in histology, laboratory sciences, biochemistry and pharmacology, were provided to assist both the Faculty of Medicine and the Intermediate Medical Institute attached to it. Fellowships were awarded to the Dean and to members of the teaching staff and supplies and equipment were provided.

Although the development of the Faculty was hampered by a shortage of junior teaching staff, gradual improvements were made in teaching, practical training, research and experimental work. An integrated curriculum was adopted in 1971. Some difficulties were caused by a lack of facilities for practical training in local hospitals; these, however, are being partly overcome by

using the Tuberculosis Society Hospital, opened in June 1972, temporarily as a teaching hospital. Moreover, a hospital adjoining the Faculty of Medicine is under construction and is expected to become operational by the beginning of the 1973/74 academic year.

A team of seven teachers of basic medical sciences, on loan from Egypt, continued to assist the Faculty after the withdrawal of WHO staff. Three teachers who had been studying abroad on WHO fellowships returned to the Faculty in 1972 and another is due to return in 1973.

Tunisia

2001 (0017) Malaria eradication programme (1966-) R UNDP

2101 (0036) Schistosomiasis control (1970-76) R—To carry out an epidemiological and malacological survey of schistosomiasis, intensify control measures and train personnel.

3001 (0018) Environmental health services (1962-74) UNDP—To develop a national environmental health programme and train personnel for its implementation.

3301 (0048) Liquid and solid wastes disposal (Oct. 1971-March 1972) R—Two consultants carried out surveys of the system for disposal of liquid and solid wastes and made recommendations for improvements.

4101 (0050) Health planning (1972-74) R—To analyse available information on the health situation, select health programmes, projects and strategic areas that should be developed, review the sectoral plan for health within the context of the fourth national socioeconomic development plan, and develop health and medical care services.

4401 (0034) Nursing education (1964-) R UNDP—To strengthen the nursing services and nursing schools through the provision of postbasic courses designed to prepare qualified nurses to become administrators, supervisors and teachers.

4901 (0037) Advisory services in vital and health statistics (1968-74) UNDP—To develop a system of vital and health statistics through the establishment of a permanent statistical service in the Secretariat of State for Public Health and the training of national staff in health statistics techniques.

6201 (0100) Medical education (1961-) R—To develop medical education.

8101 (0035) Cancer control (1964; 1972-) R—To develop the programme of the National Cancer Institute.

9601 (0032) Family planning aspects of maternal and child health (1971-) UNFPA—To develop integrated maternal and child health and family planning services as part of the health services, train personnel, and develop biomedical research.

Yemen

1201 (0006) Tuberculosis control (1970-) R—To implement a comprehensive national tuberculosis control programme, integrated into the basic health services.

1801 (0016) Smallpox eradication (1968-74) R—To carry out mass vaccination against smallpox and organize a reporting and surveillance system in order to keep the country free from smallpox.

2101 (0005) Schistosomiasis control (1972-) R—To make epidemiological and malacological studies of schistosomiasis, formulate and implement a control programme and train the necessary staff.

3201 (0017) Environmental health services and community water supply (1969-) R—To develop the national community water supply programme, investigate and design various types of water supply systems, particularly for towns and rural areas, and take measures for the solution of environmental health problems.

3202 (0023) Water supply, Sana'a and Hodeida (1970-73) UNDP—To prepare a master plan and carry out preliminary engineering and feasibility studies in respect of the water supplies for Sana'a and Hodeida.

4001 (0012) Local health services, Taiz (1965-75) R UNICEF—To develop comprehensive health services for Taiz town and province, using a health centre in Taiz for demonstration and for training auxiliary health personnel, and establishing further centres and subcentres, training their staff and developing their services.

4002 (0015) Local health services, Hodeida (1963-) R UNICEF—To develop comprehensive health services for Hodeida town and province, using a health centre in Hodeida for demonstration and for training auxiliary health personnel, and establishing further centres and subcentres, training their staff and developing their services.

4003 (0003) Public health administration (1961-) R—To improve the planning and administration of health services.

4201 (0018) Public health laboratory services (1971-) R—To establish public health laboratory services, starting with a central public health laboratory in Sana'a and provincial laboratories in Taiz and Hodeida; and to train personnel.

4301 (0020) Organization of medical care (1969-72) R—To coordinate and develop hospital and medical care services.

4801 Prosthetic appliances workshop, Sana'a (April-Oct. 1972) R—A consultant assisted with the organization and management of the workshop.

5601 (0026) Food and nutrition programme (1971-74) UNDP/FAO—To organize and extend school feeding and hospital dietary services, train personnel and promote nutrition education.

6101 (0008) Institute of Health Manpower Development, Sana'a (1956-75) UNDP—To develop the Institute, which provides training for auxiliary health personnel, including sanitarians, nurse/midwives and laboratory technicians; to demonstrate modern methods for the prevention and cure of certain diseases and for the control of communicable diseases; and to facilitate the organization of public health services.

EMRO

1001 (0182) Epidemiological services (1969-) R VC VS—To assist governments in developing their epidemiological services in order to be able to cope with epidemics or natural disasters such as earthquakes and floods.

1801 (0088) Smallpox eradication (1967-75) R VS—To assist countries of the Region in the planning, implementation and assessment of their smallpox eradication programmes, and also to assist national laboratories in developing diagnostic methodology and in improving the production of freeze-dried smallpox vaccine.

EMRO (*continued*)

2001 (0057) Malaria coordinating meetings (1968-74) R—To facilitate participation in intercountry malaria coordinating meetings for discussion and exchange of information between national authorities responsible for malaria eradication programmes.

Three meetings were held during the period under review—one between Jordan and the Syrian Arab Republic in Dera'a, Syrian Arab Republic, on 30 March 1972, one between Jordan, Lebanon and the Syrian Arab Republic, in Damascus, on 7 and 8 June 1972, and one between Iraq, Jordan, Lebanon, Syrian Arab Republic and Turkey, in Amman, from 21 to 23 November 1972.

2401 (0151) Training in mycology, Teheran (Oct.-Dec. 1972) R—To train personnel in mycology techniques, with special emphasis on diagnosis. Provided—a consultant, fellowships for trainees from 12 countries of the Region, and supplies and equipment.

3001 (0079) Refresher course for sanitarians (1966-72) UNDP—To provide advanced training in sanitation and supervision of sanitation services, and training for experienced national sanitarians from selected countries.

3101 (0119) Seminar on water pollution control, Khartoum (20-27 Nov. 1972) R—To study the increasing pollution of natural waters resulting from the discharge into them of water-borne sewage and industrial effluents, and to consider new methods of controlling and preventing water pollution. There were 15 participants from nine countries of the Region, and a representative of the International Association on Water Pollution Research attended. Provided—a consultant, two temporary advisers, and the cost of attendance of the participants.

3701 (0157) Rodent control (1967-) R—To investigate problems of rodent infestation, to propose control measures and to train municipal, port and quarantine officers responsible for rodent control in the principles and practice of rodent control operations.

3702 (0206) Seminar on Health Hazards of Pesticides, Cairo (17-21 July 1972) R—To review the public health problems arising from the use of pesticides, particularly in agriculture, and discuss ways of protecting the applicators and the general population against the health hazards involved. There were 17 participants (four of them from agricultural administrations) from 10 countries of the Region and FAO and ILO were represented. Provided—a consultant and the cost of attendance of the participants.

4004 (0176) Seminar on Health Problems of Nomads (June-Aug. 1972) R—A consultant visited some countries of the Region to collect background information for a seminar planned to be held in 1973.

4101 (0198) Course on health and manpower planning, Teheran and Alexandria (25 Nov. 1971-10 Jan. 1972) R—To train national health staff in the principles of socioeconomic and manpower planning, with special emphasis on health and manpower planning; in research in and evaluation of public health programmes and practices; and in the management of health organizations and institutions. There were 12 participants from nine countries of the Region. Provided—two consultants, two lecturers, and the cost of attendance of the participants.

4201 (0061) Training of laboratory technician tutors (1972-) R—To provide laboratory technician tutors with advanced training in the methodology of teaching several laboratory disciplines.

4202 (0068) Travelling seminar of directors of health laboratories, Khartoum and Cairo (5-17 Dec. 1971) R—To enable directors of health laboratory services in countries of the Region to exchange views on the organization of laboratory services, the procedures used, and the training of laboratory personnel. Provided—a consultant and the cost of attendance of the 12 participants.

4302 (0133) Training courses in the maintenance and repair of medical equipment (1972-) R—To organize courses for training technicians to service and maintain hospital, laboratory and other equipment in health establishments in the Region.

4702 (0205) Training of medical X-ray inspectors (2-28 Oct. 1972) R—Diagnostic X-ray inspection kits were provided for the 10 participants in a training course in the techniques of radiological health surveys, held in Nicosia.

4703 (0202) Radiotherapy centres (dosimetry services) (1972-74) R—To assist radiotherapy centres in the Region in the calibration of X-ray and isotope teletherapy units, and in the verification of the accuracy of their radiation dosimeters.

4801 (0212) Regional training centre for technical orthopaedics, Teheran (1972-) R—To develop the teaching programmes and improve the training at the centre.

4901 (0101) Medical records and statistical documentation (1966-) UNDP—To provide advice on medical records in hospitals and health centres to countries in the Region that are developing medical records units, and to train national medical records officers.

4902 (0208) Seminar on Vital and Health Statistics, Damascus (18-25 Sept. 1972) R—To discuss the routine collection of data for the preparation of health information systems and country profiles and make recommendations for its improvement. There were 16 participants from 12 countries of the Region and eight observers from the host country. The Regional Director and staff members attended the seminar. Provided—a consultant, a temporary adviser, and the cost of attendance of the participants.

5103 (0188) Regional training programme in child health and midwifery (1970-73) R UNICEF—To improve the teaching of child health to medical and other health personnel at the American University of Beirut and plan and initiate a programme for training graduate and public health nurses in midwifery.

5201 (0195) Industrial hygiene course, Zagreb (1970-73) R—To provide a training programme especially designed to meet the needs of industrial hygienists from developing countries.

5403 Mental health group meeting, Alexandria (4-7 Sept. 1972) R—To formulate general guidelines for the development of mental health services in the Region and make recommendations concerning future mental health activities. Provided—a consultant and the cost of attendance of the seven participants, who came from six countries of the Region.

5501 (0023) Dental health services (1972-) R—To assist countries of the Region in developing dental services, particularly as regards the preventive aspects, and in training dental health personnel.

5601 (0161) Training in nutrition (1971-74) UNDP—To promote the organization of nutrition services by providing advisory services and training key personnel.

5604 (0186) Regional nutrition course for the Near East (1970-) R UNICEF (FAO) (UNESCO)—To establish within

the Region adequate facilities for the training of nutrition workers and high-level government personnel from ministries of health, agriculture and planning and from other ministries in various aspects of nutrition, with a view to promoting the formulation of nutrition policies and the execution of food and nutrition programmes.

6002 (0045) Participation in educational meetings (1959-) R—To enable countries of the Region to participate in seminars, conferences and training courses organized in other regions and by other agencies.

6101 (0049) Assistance to health institutes in the Region (1969-) R—To assist scientific institutes in the Region which are engaged in work of importance in the field of public health, especially in education and training of medical and health personnel.

6201 (0084) Medical education (1965-) R—To assist countries in the Region in developing undergraduate and post-graduate medical education, and in establishing new medical faculties.

6202 (0121) Exchange of professors and scientific workers (1969-) R—To assist in the exchange of professors for short periods following agreements between schools.

6203 (0163) Training centres in educational sciences and medical pedagogy (1971-) R—To promote the training of members of the medical faculties of the Region in educational science and methodology. (Assistance will be provided through

a regional teacher-training centre at the Pahlavi University, Shiraz, Iran, and national centres.)

6204 (0166) Research in medical education (March 1972) R—A follow-up meeting of the Second Regional Conference on Medical Education (Teheran, 1970) was held at the Regional Office from 27 to 29 March 1972 to discuss the progress made in medical education in the Region since the conference. Plans were made for a workshop in 1973.

9601 (0194) Integration of family planning activities into health services (1970-) UNFPA—To assist countries of the Region in the planning, organization, management and evaluation of family planning programmes as part of the health services, in the training of all categories of personnel and in the upgrading of institutions for training and research in human reproduction and population dynamics.

9602 (0196) Maternity-centred family planning programme (1972-) UNFPA—To develop family planning aspects of maternal and child health work in countries of the Region. The project is aimed at providing opportunities for improved maternal and child care including family planning guidance and related services, and organizing the training of technical personnel.

CO 01 (0179) United Nations Development Programme co-ordinating services (1970-) R—To help countries of the Region to obtain and use UNDP resources for assistance in the health field. A special service, available to governments, has been established under the direct supervision of the Regional Director.

WESTERN PACIFIC REGION

British Solomon Islands Protectorate

2001 Malaria eradication programme (1970-77) R UNDP

4001 Basic health services and family health (1965-75) R UNICEF—To expand and strengthen the network of local health services and train auxiliary health personnel.

4501 Health education advisory services (1971-72) R—To strengthen the health education service in the Medical Department, establish a pattern for health education activities to be carried out at village level by health personnel, improve the teaching of health education in schools and teacher-training colleges, and organize seminars, conferences and meetings on health education for other services, government departments and nongovernmental organizations.

China ¹

3001 Environmental health advisory services, Taiwan (1970-72) R—To plan a programme for the improvement of environmental sanitation in urban and rural communities and ensure liaison among various agencies with jurisdiction over environmental health matters.

3202 Comprehensive water supply and sewerage development programme, Taiwan (1971-72) UNDP—To provide water supply and sewerage facilities to the largest possible number of urban dwellers.

4401 Nursing administration, Taiwan (1967-72) R—To strengthen the nursing division of the provincial department of health and increase its participation in the development of health programmes; to improve nursing organization, administration and supervision; to carry out studies in nursing practice; and, in collaboration with the education authorities, to improve the programmes and the practical training facilities for student nurses.

4801 Physical and occupational therapy, Taiwan (1966-72) R—To organize collegiate courses for training physical and occupational therapists and to improve professional standards.

5501 School dental health, Taiwan (1972) R UNICEF—To review the school dental health programme.

6401 Education and training of health personnel, Taiwan (1970-72) R—To raise the standard of training of all categories of health personnel.

Fiji

4201 Central pathological laboratory (1971-) R—To establish a modern bacteriological department at the central pathological laboratory and train personnel in bacteriological techniques.

6201 Fiji School of Medicine (1972-81) R—To strengthen the School of Medicine.

¹ Following the adoption by the Twenty-fifth World Health Assembly of resolution WHA25.1, the Organization closed down all its assistance projects in China (Province of Taiwan) by 30 June 1972.

Gilbert and Ellice Islands

4401 Nursing education (1964-68; 1970-72) UNDP UNICEF—To establish programmes for training nursing personnel for the hospital and health services (phase I — 1964-68); to strengthen the public health nursing aspects of the basic curriculum of the school of nursing attached to the Central Colony Hospital, increase the number of nursing personnel and improve their quality (phase II — 1967-72). Provided—a public health nurse educator and seven fellowships.

During phase I studies of community health needs and resources were undertaken, an assessment of the nursing and midwifery courses was made, and the curricula were revised, resulting in the establishment of a three-year programme in basic nursing/midwifery, followed by a one-year internship programme. In-service training programmes for nursing/midwifery personnel were started. During phase II public health nursing was included in the basic nursing/midwifery and internship programmes, the field practice areas for community health nursing were reorganized, a rural demonstration area was set up, and a public health nursing manual was compiled. The programme developed is adequate to train nurses for both hospital and public health nursing. In-service training for both hospital and public health nursing was introduced on a regular basis. Legislation to regulate nursing and midwifery practice was enacted in 1971.

The overall aims of the project were achieved; when WHO assistance ended there were three trained national teachers in the school of nursing, which had 34 students, and 39 national nurses working in the hospitals and 71 in the public health services. It has not yet been possible, however, to raise the standard of general education required for admission to the nursing/midwifery programme.

9601 Family health (1971-) UNFPA UNICEF—To organize and make available to the whole population services related to human reproduction and fertility, including services for spacing and limitation of births and for treatment of subfertility, and to carry out a programme of information and education of the public.

Hong Kong

4901 Epidemiology and health statistics (Aug.-Oct. 1972) R—A consultant reviewed the epidemiological and statistical work of the health department and advised on measures for strengthening and improving the relevant services.

Japan

6401 College of Health Sciences, University of the Ryukyus (1970-73) R—To strengthen the College, which was set up in 1969 to train nurses, midwives, medical technologists, biostatisticians, health education workers and epidemiologists.

Khmer Republic

1201 Tuberculosis control (1965-72) R UNICEF—To set up the nucleus of a national tuberculosis control service, with emphasis on preventive measures, and to carry out a control programme.

2001 Malaria control (1964-76) R UNDP—To extend anti-malaria activities progressively in order to protect the 2.3 million people living under malaria risk; and to promote the development of an integrated health service by training malaria personnel for the provincial and district health organizations and involving the rural health services in malaria case-detection and treatment.

2901 Epidemiology and health statistics (1966-75) R—To establish in the Ministry of Public Health an epidemiological and health statistical service responsible for planning and guiding national disease control programmes; to study local epidemiological patterns of causes of morbidity and mortality as a basis for the formulation of such programmes; to reorganize the health statistics systems in hospitals, health centres, dispensaries and other health care institutions; and to train health service personnel in epidemiology and health statistics.

3001 Environmental health advisory services (1968-75) R—To establish a public health engineering unit in the Ministry of Public Health and coordinate its work with the work of other units of the Ministry; and to draw up and implement country-wide environmental health programmes.

3201 Water supply for Kompong Som (1970-72) UNDP—To study and implement a medium-term water supply development programme that would meet the needs of the population until 1980. Provided—a sanitary engineer (project manager), assigned to the Ministry of Public Works, and equipment.

A well-drilling programme was developed, which resulted in the construction of four new wells. A vehicle and miscellaneous drilling equipment were supplied to assist the Government in continuing the programme. Designs, plans, specifications and tender documents were drawn up for (i) equipping the new wells with pumps, constructing well houses and connecting the wells to the water distribution system; (ii) re-equipping and strengthening the surface water pumping station; (iii) constructing and equipping a new water storage reservoir; and (iv) strengthening the water distribution system. In addition, information on population growth, town planning and the development of a far-lying surface water source was collected and evaluated.

On the basis of the design work, WHO entered into an agreement with a local construction firm which undertook to procure the equipment and piping and carry out the installation of the pumping station and new wells. Construction is planned to begin in 1973 and to be completed in about four months. The rest of the work, consisting of the construction of the well houses and of the new water storage reservoir and the installation of the new pipelines for the distribution system, is being carried out by the Government. It was started in 1972 and is scheduled for completion during the first half of 1973.

3202 Water supply and sewerage, Phnom Penh (Aug. 1972-Feb. 1973) UNDP—Two consultants on management (September-November 1972) and on sanitary engineering (from August 1972) assisted the Government in formulating a project request for a programme of improvement and development of the water supply, sewerage and drainage systems of Phnom-Penh. The second consultant is also assisting with the preparations for the operational phase of the project.

3301 Irrigation and drainage networks of the Prek Thnot River (June-July 1972) UNDP/FAO—The sanitary engineer assigned to the Kompong Som water supply project (Khmer Republic 3201) advised on the public health measures to be considered in planning for the population affected by the FAO-assisted irrigation and drainage project.

4201 Training of laboratory technicians (1968-76) UNDP—To train laboratory technicians for the health laboratory services in Phnom Penh and the provinces.

4202 Organization and operation of health laboratory services (1972-) R—To organize laboratory services to meet the needs of the health and medical services, strengthen and develop the resources of the Institute of Biology, improve health laboratory services in the hospitals in Phnom Penh and the provinces and in urban and peripheral dispensaries, and train laboratory staff.

4301 Medical services administration (Dec. 1971-March 1972) R—A consultant assisted in assessing the urgent health needs of the population during the present emergency and recommended measures for improving the situation. He also advised on health measures that might be taken in preparation for and during the post-emergency period.

4801 Rehabilitation of the physically handicapped (1971-77) R UNDP—To establish a unit that could later become a school for training physical and occupational therapists and set up a national rehabilitation service.

6401 Education and training of health personnel (1971-76) R—To develop and strengthen the centres for the training of all categories of health personnel and to develop a community health centre to serve as a model for centres to be established later in other parts of the country.

Laos

2001 Malaria control (1969-78) R—To build up the administrative and operational facilities of the Central Malaria Service to the level required to carry out an antimalaria programme, in the first place in the Vientiane plain.

3001 Environmental health advisory services (1970-71) UNDP—A sanitary engineer was assigned to this project, the original aim of which was to establish, in the Ministry of Public Health, a division of sanitary engineering with responsibility for carrying out activities for the promotion of environmental health. The project was planned to last four years; however, in the light of experience, it was decided to terminate it at the end of 1971, since the number of trained personnel was not yet adequate to carry out a programme of development in the field, and to reinstate it when sufficient staff had been trained.

The main accomplishments were legislative action to establish an environmental sanitation service in the Ministry of Public Health, and the formulation of detailed proposals and a suggested timetable of implementation concerning the training of staff for the service and its programme of work.

4001 Development of health services (1968-79) R UNDP UNICEF—To develop and strengthen the general health services, beginning in Vientiane Province, which will serve as a pilot area; to organize a central advisory body to review the organization, programmes and coordination mechanism of the health services; and to formulate and carry out a programme for training health manpower. The former project Laos 4002 (Public health administration advisory services) has been incorporated into this project.

4201 Health laboratory services, Vientiane (1953-78) R UNICEF—To establish a public health laboratory service and train laboratory personnel.

4401 Nursing education (1962-79) UNDP UNICEF (USAID) (Asia Foundation) (Colombo Plan)—To set up a school of nursing and midwifery for training personnel for the country's hospital and health services, which are to be extended and improved.

4801 Rehabilitation of the physically handicapped (1967-73) UNDP (UN Office of Technical Cooperation)—To assess the

Laos (continued)

extent of the problem of the physically handicapped, plan and operate rehabilitation facilities and train staff for them, and review legislation dealing with the physically handicapped.

4901 Vital and health statistics advisory services (1968-77) R—To establish a vital and health statistics service in the Ministry of Public Health and to train staff.

5601 Nutrition advisory services (1968-74) R UNICEF—To improve nutritional levels in the community and to coordinate, under a national nutrition policy, all food and nutrition work carried out by international and national governmental and nongovernmental agencies.

6201 Royal School of Medicine (1967-78) R—To strengthen the faculty of the Royal School of Medicine.

6401 Workshop in medical education (11-13 Oct. 1972) R—Two consultants and three WHO staff members assisted in organizing a workshop to acquaint medical teachers with the latest advances in teaching and learning methods and to provide the opportunity for an appraisal of current activities and methods used in the country. There were 30 participants.

9601 Maternal and child health/family welfare (1971-78) UNFPA UNICEF—To provide effective maternal and child health care and advice on family planning with the ultimate objective of securing a higher standard of living for the family as a whole.

Malaysia

2001 Malaria eradication programme, West Malaysia (1967-81) R; 2002 East Malaysia (Sabah) (1961-78) R UNDP; 2003 East Malaysia (Sarawak) (1961-78) R UNDP

2901 Epidemiological services (1971-76) R—To establish, in the Division of Communicable Disease Control, Ministry of Health, an epidemiological and statistical service responsible for planning and guiding national disease control programmes; to study the local epidemiology of causes of morbidity and mortality as a basis for the formulation of such programmes; to improve liaison and coordination among the Ministry's communicable disease control, medical records and health statistics services, the laboratory services (particularly the Institute of Medical Research) and other peripheral government units concerned with disease control; and to train staff in epidemiological work.

3001 Environmental health advisory services (1966-75) R UNICEF—To develop a national environmental health scheme, to implement sanitation projects, including water supplies for rural communities, through the health authorities and other governmental agencies, and to train sanitation staff.

4001 Development of health services—advisory services (1964-78) R UNICEF—To strengthen and expand the basic health services in East and West Malaysia and train personnel according to a consolidated plan which includes phasing of expansion and the development of uniform standards throughout the country.

4002 Development of health services—operational research (1971-72) R—To undertake health practice research with a view to developing methods for the efficient organization and administration of local health services, and, from the knowledge and experience gained, to establish a health policy and programme for local health service development under the second five-year development plan. Provided—a medical officer, a mathematician and a public health nurse.

Representative samples of eight non-metropolitan districts of West Malaysia with a total population of some 900 000 were

used for the study. Work started in 1968 (under project Malaysia 4001) and field studies were made between February 1970 and December 1971. Information was obtained from patients coming to the local health care units and on the operation of the units. The data collected concerned the patterns of diseases or conditions most frequently observed in the community, health service coverage, types and quality of services provided by the health care units, staff time spent on different types of services, and the resources available and utilized. Study of the data led to the conclusion that, without additional resources, better performance and coverage could be obtained by modifications in the time spent by staff in different activities and by developing a more practical referral system, and that the quality of health services provided could be improved by providing the health care units with basic facilities for diagnosis and with transport, and by strengthening supervision. The suggestions made in this connexion were accepted by the Government and will be tested and applied throughout the country.

As a result of the project, the Government has established a permanent operational research unit in the Ministry of Health. This unit will use the methodology employed in the project for further studies in related fields.

4301 Organization of medical care (Sept.-Dec. 1972) R—A consultant surveyed patterns of hospital design, assessed needs and resources for the alteration of existing hospitals and the construction of new ones, and drew up guidelines for hospital alteration. Another consultant made a survey of hospital management and recommended measures for improving and developing hospital management practices; he also helped to prepare guidelines for hospital development.

4501 Health education advisory services (1971-72) R—To develop the health education components in various special programmes (family planning, school health, applied nutrition, etc.), establish a one-year certificate course for health education personnel, including personnel from the Ministries of Health and of Education, develop the school health programme, and expand the health education services in East Malaysia.

5401 Mental health advisory services (Dec. 1971-Feb. 1972) R—A consultant helped to plan and implement an in-service education programme for acquainting a group of nurses (psychiatric nursing tutors and sisters, clinical instructors and staff nurses) with the philosophy and practice of community mental health, including both rehabilitation and prevention of mental illness.

5601 Applied nutrition (1967-75) R (FAO)—To plan and carry out nutritional surveys in a pilot area where an applied nutrition programme is being launched, develop nutrition education and supplementary feeding programmes, and train the personnel needed for implementing and evaluating the health aspects of the programme.

6201 University of Malaya (1965-75) R—To strengthen the teaching staff of the Faculty of Medicine of the University of Malaya, particularly in the fields of preventive medicine, public health, nursing and medical recording.

6401 Public Health Institute (1970-) R UNICEF—To develop the Public Health Institute, whose functions are to provide a high standard of training for health personnel, geared to the needs of the country; to undertake studies in public health and disseminate the knowledge thus gained; to provide services, not otherwise available, for the improvement of health programmes and for demonstration purposes; and to assist the Ministry of Health in the coordination of its various health training programmes.

New Hebrides

2001 Malaria control (1970-81) R—To build up the operational facilities for an antimalaria programme and organize antimalaria operations within the framework of the general health services.

4001 Development of health services (1969-75) R UNDP—To develop the general health services, establish methods and practices for the efficient operation of the rural health programme (particularly as regards maternal and child health, tuberculosis control and antimalaria and environmental sanitation work), and provide training, including in-service training, for health service personnel. The former project New Hebrides 4002 (Public health administration advisory services) has been incorporated into this project.

4401 Nursing education (1970-75) R—To formulate and implement short-term and long-term plans for the strengthening and development of a system of nursing education in the country.

Papua New Guinea

4101 National health planning (1972-) R—To review and develop health policy and formulate a national health plan.

4401 Nursing advisory services (1970-75) R—To strengthen the public health nursing aspects of the curricula of the schools of nursing and establish a postbasic course in public health nursing.

6201 Medical faculty, University of Papua New Guinea (1970-80) R—To strengthen the faculty of the School of Medicine (formerly the Papua Medical College) and raise the standard of teaching.

6401 Education and training advisory services (1971-80) R—To plan, implement, and evaluate various types of courses in training institutions under the jurisdiction of the Division of Medical Training and other institutions designated by the Government for the purpose of training government personnel.

Philippines

1201 Tuberculosis control (Jan.-May 1972) R UNICEF—A consultant evaluated the operation of 10 provincial tuberculosis programmes and made recommendations concerning the feasibility of extending control programmes to other provinces.

2001 Malaria eradication programme (1958-76) R (USAID)

2801 Rabies control (Jan.-Feb. 1972) R—A consultant studied the feasibility of undertaking a programme for eradicating rabies from the country and investigated the possibility of producing sufficient rabies vaccine to meet the needs of a national campaign.

3201 Community water supply (1969-72) UNDP—To improve and extend provincial water supply systems. Provided—a sanitary engineer for the duration of the project, a consultant on operation and maintenance of water supply systems for two months in 1971, and four fellowships.

A review was made of 25 provincial water supply systems and proposals were made for immediate improvements to 16 of them. The improvements to eight of these have been made or are in progress and when completed will benefit 270 000 people. In addition, a sector study of community water supplies was prepared. It included an inventory of existing water supplies, an evaluation of the current state of water supply development and new development targets, and recommendations on the organizational, financial and technical measures needed to attain these targets.

3202 Laguna de Bay water quality laboratory design (June-Aug. 1972) UNDP—A consultant assisted the engineering staff of the Laguna de Bay Development Authority in detailed design and planning of a water quality laboratory. The work was part of a large-scale feasibility study on development of the Laguna de Bay water resources.

3203 Study of the Laguna de Bay water resources development (May 1972) UNDP/Asian Development Bank—Consultants advised in the environmental implications of the project.

4001 General health services development (1969-74) R UNICEF—To improve the organization and administration of the health and medical care services, undertake national health planning in the context of overall planning for development, review health manpower education and training schemes, and develop working relationships between the national health administration and other agencies, both public and private, that are concerned with health.

4101 National health planning (1972-76) R—To develop a comprehensive national health plan and train health personnel responsible for the different aspects of planning.

4402 National seminar on public health nursing education (June-Aug. 1972) R—A consultant assisted in assembling background information for and in organizing a seminar to consider the situation regarding public health nursing in the country, its probable development, and ways of strengthening the teaching of public health nursing in basic nursing curricula.

5101 Maternal and child health advisory services (Dec. 1971-June 1972) R—A consultant assisted, together with staff of the general health services development project (Philippines 4001), in reviewing the prevailing causes of maternal and child mortality and morbidity and in making recommendations on maternal and child health care (particularly maternity care) provided as part of the general health services.

5201 Occupational health (1970-72) UNDP/ILO—To establish the legal, administrative and operational framework for a coordinated national programme of occupational health and safety, develop all the technical components of the programme, including university facilities for postgraduate training, and, on the basis of an assessment of the present situation and of projected industrial developments, plan for future expansion of occupational health and safety work.

These objectives were to be attained by strengthening and coordinating the relevant activities of the Department of Health, the Department of Labour, and the Institute of Public Health. WHO assigned an industrial hygienist to the Division of Industrial Hygiene, Department of Health; ILO provided two advisers to the Department of Labour—one, on occupational safety, to the Bureau of Labour Standards and one, on occupational health and workmen's compensation, to the Bureau of Workmen's Compensation.

In the Bureau of Workmen's Compensation a system for reporting occupational diseases and injuries was formulated, a start was made on the establishment of a disability evaluation laboratory, and a schedule of occupational diseases for which compensation could be allowed was prepared. In the Bureau of Labour Standards, new safety orders were formulated, data were collected on safety conditions and emergency medical facilities in selected groups of industries and a study was made concerning facilities for environmental testing. In the Department of Health the system for providing industrial hygiene services was evaluated and found adequate to meet the country's needs. Plans were then developed to improve the effectiveness of the services by installing and calibrating new instruments in

Philippines (continued)

the industrial hygiene laboratory of the Department's Bureau of Research and Laboratories, by obtaining acceptance of a system for issuing uniform industrial hygiene standards in the Division of Industrial Hygiene, and by a wider use of the industrial hygiene services units in regional health offices.

In the course of the project, more data were obtained to help in defining the extent of the occupational health problems and preliminary surveys were made in a number of industrial establishments where occupational health and safety hazards might be found. A number of safety inspectors, compensation officers, industrial physicians and industrial hygienists were given training, and eight fellowships were awarded for studies abroad.

5501 Dental health advisory services (June-Sept. 1972) R UNICEF—A consultant reviewed the progress made since 1969, when a dental health consultant was last provided, evaluated the integrated dental services system of the Departments of Health and of Education in Rizal Province, and assessed the feasibility of introducing the system in other provinces. He also assisted the Bureau of Dental Health Services with a national conference on dental health.

6401 University of the Philippines (1970-81) R—To strengthen the staff of the University of the Philippines, in particular that of the Institute of Public Health, which is the only school of public health in the country and which serves as a regional training centre and is used by WHO in the organization of courses on national health planning.

7401 Food and drug administration (May 1972) R—A consultant reviewed the quality control programmes in the food processing and pharmaceutical industries and the extent of the food pollution problem, assessed the technical capabilities and facilities of the Food and Drug Administration, and made recommendations concerning a long-term plan to improve the quality control programmes. He also helped to prepare a project document as a basis for a request for assistance from UNDP.

9603 Maternity-centred family planning (1971-76) VD UNFPA UNICEF—To develop the staff and facilities of 25 teaching hospitals and associated teaching institutions with a view to the inclusion of maternity-centred family planning training and service in their work.

9604 Nursing education in family planning (1971-) UNFPA—To organize national workshops to prepare faculty members to introduce family planning in basic nursing curricula.

The second workshop was held at the Institute of Public Health, Manila, from 8 May to 2 June 1972. It was attended by 34 faculty members from 23 schools of nursing. The WHO nurse educator attached to the family planning advisory team (project WPRO 9603) and four temporary advisers assisted in conducting it. To follow up the workshop, teaching aids and materials have been provided to nursing schools.

9605 Assistance to the teaching programme of the Institute of Public Health, University of the Philippines, in family planning, human reproduction and population dynamics (1971-) UNFPA—To expand the teaching facilities and activities of the Institute of Public Health in family planning; to strengthen the long-term academic programme of the Institute in family planning; and to develop leadership of the Institute in curriculum planning in the field of family planning, human reproduction and population dynamics.

Republic of Korea

1201 Tuberculosis control (1962-) R UNICEF—To implement a national tuberculosis control programme.

1301 Leprosy control (Aug. 1972-Feb. 1973) R VL UNICEF—A consultant is assisting the Ministry of Health and Social Affairs in implementing the recommendations of previous consultants and advising on the measures required to coordinate the work of different agencies and integrate it into the general health services. Staff of the leprosy control programme and graduates of the medical and allied health professions have been given training in control methods.

2901 Epidemiology and statistics advisory services (1968-78) R—To organize and develop a central epidemiological service and a disease intelligence network in the Ministry of Health and Social Affairs; to improve the collection, recording and utilization of health statistics; and to coordinate health laboratory services with the epidemiological services.

3201 Advisory services on community water supply and sewerage (1972-75) R—To plan and implement a comprehensive urban and rural water supply and sewerage programme.

3202 Upland development and watershed management (1972-73) UNDP/FAO—To effect sanitary improvements at the village level in selected subwatersheds in the project area.

4001 General health services development (1963-77) R UNICEF—To develop the public health services in the demonstration province (Chungchong Namdo) and the local health services in other provinces; and to train local health personnel at the Division of Training of the National Institute of Health.

4301 Organization of medical care (Oct. 1971-April 1972) R—A consultant advised on the establishment of a standard medical records system in hospitals and assisted with an orientation course for medical records personnel.

6401 Education and training of health personnel (1969-74) R UNFPA UNICEF—To provide education and training for health and medical workers, including undergraduate and postgraduate training for physicians and basic and postbasic training for nurses, sanitarians and other health workers.

6402 Workshop on medical education (25-27 Oct. 1972) R—Three consultants and a staff member assisted in organizing a workshop to acquaint medical teachers with the latest advances in teaching and learning methods and to provide an opportunity for an appraisal of current activities and methods used in the country. There were 30 participants.

Singapore

1001 Communicable diseases advisory services (1972-76) R—To develop and strengthen the epidemiological service of the Ministry of Health, study the epidemiology of the main causes of morbidity and mortality (particularly communicable diseases), develop procedures for the investigation, prevention, diagnosis and control of certain diseases, and train staff in epidemiological work.

3302 Planning for sewerage development and water pollution control (1970-73) UNDP—To prepare a long-term master plan for the development of sewerage facilities, coordinated with plans for physical development, and for the expansion of the sewerage system; and to conduct studies on river and coastal water pollution, with a view to developing a programme for its abatement and control.

4301 Management of hospital services (Sept. 1972-March 1973) R—A consultant has been provided to assess the administration of the government hospital services, and to recommend improvements and a procedure for periodic evaluation of progress.

5201 Occupational health advisory services (Dec. 1971-March 1972) R—A consultant assisted the Industrial Health Unit, Ministry of Labour, in the assessment and control of environmental hazards in industry, with particular attention to the problem of dust in granite quarries. He also advised the Department of Social Medicine and Public Health, Faculty of Medicine, University of Singapore, on the formulation of an industrial hygiene laboratory and training programme.

5202 National seminar on the organization of industrial health services for small industries (13-17 Nov. 1972) R—Two consultants assisted in the organization of a seminar during which the health situation in small industries was reviewed and the possibility was studied of providing them with health services. There were 40 participants.

5601 Nutrition advisory services (1972-) R UNICEF (FAO) —To plan the development of public health nutrition services.¹

6301 Development of medical specialties (1971-76) R—To establish and organize specialist units in hospitals and to train in advanced techniques staff to man these units.

6401 University of Singapore (1972-) R—To strengthen the teaching staff of the Faculty of Medicine of the University, particularly in the fields of preventive medicine, public health and organization of medical care. Consultant services were provided between 1952 and 1970.

Tonga

4401 Nursing education (1969-73) R—To strengthen the basic nursing curriculum of the Queen Salote School of Nursing, improve the quality and increase the number of nursing and midwifery personnel for the expanding health services, and prepare nursing legislation.

9601 Maternal and child health/family planning (1971-74) UNFPA UNICEF—To organize and implement a family planning programme within the health services, particularly in the maternal and child health clinics, and to train the necessary staff.

Viet-Nam

1101 Venereal disease control (1966-74) R UNICEF—To reduce the incidence of the venereal diseases, and strengthen and improve the syphilis serological work carried out in national laboratories.

1201 Tuberculosis control (1958-75) UNDP UNICEF—To set up a national tuberculosis control programme as a permanent part of the basic health services.

2001 Malaria pre-eradication programme (1959-) R (USAID) —To train national staff and make preparations for the implementation of a malaria eradication programme.

2901 Epidemiological surveillance and quarantine (1970-74) R—To develop epidemiological services at the central and regional levels, strengthen the application of the International Health Regulations (1969) and train staff for these purposes.

3001 Environmental health advisory services (1966-76) R—To strengthen the environmental sanitation service in the Ministry of Health and introduce improvements in public water supply, human excreta disposal, refuse disposal, food hygiene and vector control in urban and rural areas.

¹ For work done under this project between 1968 and 1971, see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 354.

4101 National health planning (1972-75) R—To strengthen the national health planning unit in the Ministry of Health, formulate a national health policy and a national health and manpower plan, and train staff.

4201 Health laboratory services (1964-75) R UNICEF—To establish a central health laboratory service and train health laboratory workers; and, later, to organize regional and peripheral health laboratory services.

4202 Production and control of biologicals (1972-) R—To improve the production and control of biologicals (especially cholera, typhoid and plague vaccines), develop the production of purified tetanus and diphtheria toxoids, and organize the purification and concentration of antitoxins for tetanus and diphtheria.

6001 Medical education (1972-81) R—To strengthen various aspects of the curricula of schools of medicine, with particular attention to preventive medicine and public health.

A workshop with 30 participants was organized from 18 to 21 October 1972, with the assistance of two consultants and three staff members, to acquaint medical teachers with the latest advances in teaching and learning methods and to provide an opportunity for an appraisal of current activities and methods used in the country.

6401 National Institute of Public Health (1969-81) R VD UNFPA—To build up a national institute of public health which will serve as a centre for the planning, standardization, organization, coordination, implementation and evaluation of training programmes for various categories of medical and health workers.

Western Samoa

1201 Tuberculosis control (1971-73) R—To consolidate and assess the tuberculosis control service in the demonstration area of Leulumoega; to standardize the methods and procedures used by all districts; and, ultimately to integrate the tuberculosis control services into the general health services throughout the country.

2201 Filariasis control (July-Sept. 1972) R UNICEF—A consultant reviewed the survey data obtained through the project, made an epidemiological assessment following the completion of the first two rounds of mass drug administration, assessed the vector mosquito density in the area of drug distribution, evaluated the field trials of vector control, and made recommendations on future activities.²

4001 National health services development (1967-75) R UNICEF —To develop and strengthen the organization and operation of the general health services, particularly at district and local levels; to improve the operation of the rural health programme; to organize in-service training for medical and allied personnel; to conduct epidemiological studies on the most important causes of morbidity and mortality in the country; and to plan disease control programmes as part of the general health services.

4002 Public administration and management advisory services (Oct.-Dec. 1972) R—A consultant advised the Health Department on the organization and maintenance of a recording and filing system and helped to train staff for this work.

4301 Hospital administration (Dec. 1971-March 1972) R—A consultant helped to assess the medical care services, advised on and assisted in strengthening hospital management practices

² For work done under this project between 1965 and 1971, see *Off. Rec. Wld Hlth Org.*, 1972, No. 197, p. 356.

Western Samoa (continued)

and procedures, and assisted in establishing two-way referral systems between the Apia General Hospital and district hospitals and between these hospitals and rural health centres and units. He also participated in the formulation of a building programme for hospital services and in the organization of training programmes for hospital staff, and advised on legislative measures for ensuring the effective delivery of medical care services.

4401 Nursing education (1972-74) UNDP—To improve the standard of nursing and midwifery education and services.

9601 Maternal and child health/family planning (1971-75) UNFPA UNICEF—To organize a family planning programme, including advice on the spacing and limitation of births and the treatment of subfertility, and train the necessary staff; to conduct surveys on the influence of high fertility and high birthrate on the health of mothers and children; and to undertake operational research on methods of meeting the country's family planning needs.

WPRO

0901 Advisory services (1961-) R—To meet requests from countries of the Region for advisory services in connexion with the planning of long-term projects or with specific problems. The following assistance was provided during the period under review:

Regional centre for training drug quality inspectors, Kuala Lumpur (Sept.-Oct. 1972). A consultant made a survey of the Pharmaceutical Laboratory and Stores, in which the regional centre will be located, advised on the improvements to be made to the drug production plant and quality control work, determined the needs of the laboratory section and the additional equipment to be supplied by WHO, and discussed the training to be provided with prospective faculty members.

Virus diseases, Trust Territory of the Pacific Islands (Aug.-Sept. 1972). A consultant investigated the incidence, distribution and causes of cataract in the population of the Marshall Islands, and made recommendations on preventive measures.

1201 Regional tuberculosis control team (1961-75) R—To assist countries of the Region in assessing their tuberculosis programmes.

1202 Tuberculosis course, Tokyo (24 July-23 Nov. 1972) R—To train national workers in the application of modern methods of tuberculosis control and stimulate the provision of practical training and demonstration in national institutions. There were 11 participants from nine countries of the South-East Asia, Eastern Mediterranean and Western Pacific Regions. Provided—three temporary advisers, two instructors (from Japan), the cost of post-course country visits for all participants, and reference material. Three staff members served as lecturers.

1301 Leprosy control advisory services (1972-) R VL—To assist in assessing the leprosy problem in countries of the Region, in strengthening leprosy services, and in training personnel.

1801 Smallpox eradication (1969-72) R—To train national staff in the production of freeze-dried smallpox vaccine and in the laboratory diagnosis of smallpox. Consultant services were provided to the Republic of Viet-Nam in 1969 and 1971-72 and to Malaysia in 1971 and fellowships have been awarded.

2001 Malaria eradication training centre, Manila (1959-61; 1963-) R VM—To provide training in the theory and tech-

niques of malaria eradication for various categories of personnel needed by countries of the Western Pacific Region and other regions.

2002 Malaria eradication assessment team (1967-) R—To make independent appraisals of the status of malaria eradication and of any special aspects of the malaria programme in the Region.

2003 Malaria epidemiological advisory services (1971-) R—To meet requests from governments for assistance in the conduct of special epidemiological investigations or in solving technical problems connected with malaria vectors and parasites. The following assistance was provided during the period under review:

British Solomon Islands Protectorate (Dec. 1971-April 1972). A consultant studied the behaviour pattern of the malaria vectors and advised on measures to interrupt malaria transmission.

Laos (Sept.-Oct. 1972). A consultant assisted in the development of a detailed plan for antimalaria operations in accessible areas.

New Hebrides (Nov. 1972-Feb. 1973). A consultant has been provided to analyse the available data, to make further detailed studies on vector bionomics, and to assist in formulating a plan for an antimalaria programme.

2101 Schistosomiasis survey, Khmer Republic and Laos (1971-73) R—To assess the distribution and importance of schistosomiasis in the area; to identify the snail intermediate hosts and establish their distribution and the mode of disease transmission; and to formulate and recommend measures for preventing the spread of infection, taking into account such factors as population movement, irrigation schemes and other activities connected with the development of the Mekong River basin. Activities under this project are initially limited to Laos.

2201 Filariasis advisory services (1971-75) R—To assist governments, especially in the South Pacific area, in studying the epidemiology of filariasis and in carrying out or evaluating programmes for controlling the disease. During the period under review assistance was provided to the Gilbert and Ellice Islands, Niue and Western Samoa.

2901 Seminar on Methods of Epidemiological Surveillance and Geographical Pathology, Manila (1-10 Dec. 1971) R—To consider ways of promoting the surveillance methodology and the use of new laboratory techniques in epidemiological investigation, and to present and discuss the geography of diseases and methods of mapping diseases and vectors. There were 22 participants from 19 countries and territories of the Region, and observers from two countries, the South-East Asian Ministers of Education Organization, the South Pacific Commission and the United States Agency for International Development. Provided—three consultants, a temporary adviser, and the cost of attendance of the participants. Seven staff members served as lecturers.

2902 Epidemiological and surveillance services (1972-81) R—To assist with epidemiological surveys, the strengthening of epidemiological and laboratory services, the establishment of disease intelligence networks, the investigation and control of outbreaks of communicable diseases such as cholera El Tor and other diarrhoeal infections, and the study of special disease problems in the South Pacific area. The following assistance was provided during the period under review:

British Solomon Islands Protectorate (March-April 1972). A consultant assessed the extent of the yaws problem and conducted a one-week refresher course on the clinical and diagnostic aspects of yaws.

Laos (Nov.-Dec. 1972). A consultant studied the rabies situation, especially in Vientiane, and the control methods in use, reviewed the laboratory facilities and procedures and made recommendations on prevention and control.

3001 Environmental health advisory services, South Pacific area (1965-77) UNDP—To assist countries and territories in the area to improve community water supplies and environmental sanitation in general.

3102 Environmental pollution control advisory services (March-April 1972) R—A consultant assisted in planning and preparing for the first regional seminar on air pollution, scheduled to be held in May 1973.

3201 Advisory services on water supply, sewerage and other environmental sanitation matters (1968-77) R—To assist governments in carrying out studies on water supply, sewerage and other environmental health programmes, and in developing such programmes.

4001 Public health advisory services, South Pacific area (1962-63; 1965-76) UNDP (South Pacific Commission)—To assist countries in the area in strengthening and developing their general health services, particular attention being given to maternal and child health work integrated into the general health services.

4101 Course on national health planning, Manila (5 June-18 Aug. 1972) R UNICEF—To acquaint national health administrators with the general principles of national planning for socio-economic development and familiarize them with the principles and methods of national health planning within the framework of such development planning and as an integral part of health administration. There were 10 participants from three countries of the Region. Provided—three temporary advisers, honoraria for lecturers and the cost of attendance of eight participants. Three lecturers were provided by the Asian Institute for Economic Development and Planning.

4102 Advisory services on national health planning (1968-77) R—To assist governments, not otherwise receiving long-term assistance in planning, in formulating national health and manpower plans as part of their national development plans.

4103 Conference on National Health Planning, Manila (2-9 Nov. 1972) R—To review the situation as regards national health planning in countries and territories of the Region; to discuss, in the context of national health planning as part of development planning, alternative ways of undertaking national health planning in different socioeconomic conditions; outline assistance that might be provided from external sources, including WHO; and formulate recommendations to assist countries in preparing, implementing and regularly updating and improving national health plans. There were 17 participants from 12 countries and territories in the Region, and observers from UNICEF and the Philippine Department of Health. Provided—five consultants and the cost of attendance of the participants.

4201 Health laboratory services (1971-) R—To assist in the organization and development of public health laboratory services, coordinated with other laboratory facilities, that can support epidemiological work, rural health services and sanitation projects.

4301 Training in maintenance of X-ray and other laboratory equipment (1969-) R—To assist governments in assessing the needs regarding the maintenance of radiological equipment, advise on the organization of maintenance services, and assist in training X-ray operators in the installation, servicing and maintenance of X-ray equipment and in the proper use of radiographic and photofluorographic equipment.

4302 Regional centre for the training of anaesthetists (1970-79) R—To assist in the operation of a regional centre in Manila for training anaesthesiologists for the countries of the Region.

4401 Nursing advisory services, South Pacific area (1967-77) R—To assist countries and territories of the area in strengthening nursing education and administration and in developing nursing services.

A workshop on nursing and midwifery was held in Suva from 11 to 22 September 1972 to exchange information on nursing and midwifery education and services in the area, consider needs and problems and their solution, formulate guidelines for training, and discuss the contribution that external agencies interested in health might make to strengthen both education and services. There were 20 participants (nurses engaged in administration and education programmes) from 10 countries and territories and observers from three.

4901 Health statistics and records advisory services (1971-75) R—To assist governments to develop a system of basic health statistics and records to meet the needs of the countries concerned and facilitate international comparison; and to train personnel.

5501 Dental health advisory services (1972-73) R—To advise on the establishment or strengthening of national dental health services, particularly those for preventive dentistry, on the basis of data gathered from national surveys and to assist in setting up or improving programmes for training dental auxiliaries. The following assistance was provided during the period under review:

Republic of Viet-Nam (Aug.-Oct. 1972). A consultant advised the Ministry of Health on the training of dental auxiliaries and on dental health education programmes, and reviewed the school dental health services.

5503 Workshop on Dental Health Services, Singapore (9-16 May 1972) R—To review the dental epidemiological data collected in previous years under the dental health advisory services project (WPRO 5501); to formulate, on the basis of the findings, guidelines for regional and national dental health services, including staffing, and for the training activities required to provide the staff; and to consider the role of the basic and school health services in relation to dental health, and especially to dental health education. There were 18 participants from 10 countries and territories of the Region. Provided—four consultants, two temporary advisers (one jointly with the South Pacific Commission), the services of two staff members and the cost of attendance of 17 participants.

5601 Nutrition advisory services, South Pacific area (1968-72) R UNICEF (FAO) (South Pacific Commission)—To conduct in-service nutrition courses and/or strengthen the teaching of nutrition in the basic training of public health and other workers in South Pacific island territories, and to undertake surveys where necessary.

6002 Regional teacher-training centre for health personnel, University of New South Wales, Sydney, Australia (1971-81) R—To assist in establishing and developing a regional teacher-training centre for health personnel at the medical faculty of the University of New South Wales, and national centres in selected countries of the Region.

8101 Cancer control advisory services (Jan.-Feb. 1972) R—A consultant assisted Fiji and the Republic of Viet-Nam in the collection of information on the extent of their cancer problem and on facilities for diagnosis and treatment and submitted recommendations on cancer control measures.

WPRO (continued)

9201 Course on immunological techniques, WHO Immunology Research and Training Centre, Singapore (20 March-9 June 1972) R—To provide medical and science graduates with a basic knowledge of modern immunology and train them in related laboratory techniques. Provided—fellowships to six trainees from three countries of the Region.

9602 Seminar on Maternity-centred Family Planning, Davao and Manila, Philippines (11-20 July 1972) UNFPA—To discuss concepts and methods of maternity-centred family planning, manpower requirements, training, education, and reporting and evaluation; to review hospital and public health work in family planning in the participating countries and consider how to extend it to include the maternity-centred approach; and to formulate guidelines for the implementation of maternity-centred family planning activities. There were 23 participants from 14 countries and territories in the Region and observers from the Population Council, the United States Agency for International Development and the International Planned Parenthood Federation. Provided—three consultants, five temporary advisers and the cost of attendance of the participants.

9603 Family planning field advisory team (1971-74) UNFPA—To provide advisory services to governments in connexion with the strengthening and development of family planning pro-

grammes and their integration within the framework of the basic health services. Special emphasis will be given to planning, organization, education and training.

9604 Teaching of family planning, human reproduction and population dynamics in medical schools (1972-) UNFPA—To assist in developing a systematic and coordinated approach to the teaching of family planning, human reproduction and population dynamics in medical schools of the Region.

9605 Advisory team on the development of educational materials for family health (1972-) UNFPA—To assist national health and other departments in the production and distribution of simple information materials on family health, including family planning, maternal and child health, and nutrition. The project consists of workshops, and, following the workshops, visits of an advisory team to participating countries.

The first workshop, for which three consultants and three temporary advisers were provided, was held in Manila from 8 to 22 February 1972. There were 16 participants from six countries of the Region and observers from FAO, UNICEF, the United States Agency for International Development and a number of institutions in the Philippines. Following the workshop the advisory team visited the Philippines, the Republic of Korea and the Republic of Viet-Nam, and the health education specialist belonging to the team visited Malaysia and Singapore.

INTERREGIONAL

0051 Field research on seroepidemiology of treponematoses (1968-) R VY—To participate in epidemiological research on patterns of regression and recrudescence of endemic treponematoses (yaws, pinta and endemic syphilis) and advise on the epidemiological surveillance of these conditions; to assist health administrations in assessing the outcome of previous mass penicillin campaigns against them; to undertake immunological surveys to determine low-level transmission and the recrudescence potential for the invasion by venereal syphilis of previously endemic treponematoses areas; to furnish representative serum collections for use in immunological studies of treponematoses by collaborating laboratories and assess the suitability for field use of immunological tests for the treponematoses; and to provide serum collections for multipurpose immunological studies in other WHO programmes.

0052 Field investigations on schistosomiasis (1967-) R—To carry out investigations on schistosomiasis. Activities include the collection and analysis of epidemiological data, the implementation, in control operations, of results obtained from the research programme, assistance to governments, and WHO operational research. They are carried out by experts representing various disciplines (e.g., epidemiology, parasitology, snail ecology, medical pharmacology, statistics, and social anthropology), who are called as required and who work either individually or in groups.

0070 Malaria eradication: Advisory services (1961-) R VM—To make provision for technical advisers who can be assigned at short notice to assist in the planning, implementation and evaluation of malaria control and eradication programmes and advise on special technical problems.

0079 Malaria eradication: Training programme (1958-) R—To prepare international and national staff of professional and subprofessional categories for advisory, executive, and teaching responsibilities in malaria control and eradication projects by providing teaching aids, courses of instruction, facilities for field training, and group visits to antimalaria programmes.

0110 Training programme for French-speaking nurses (1964-) R—To provide an opportunity for French-speaking nurses, in preparation for increased responsibilities in projects assisted by WHO, to undertake advanced courses in (i) special fields of nursing (ii) teaching methodology, (iii) administration of nursing services, and (iv) the study of nursing problems, needs and resources.

0113.1 International course on the epidemiology and control of tuberculosis, Prague (5 April-9 Aug. 1972) R UNDP—The eleventh of a series of annual courses organized in cooperation with the Postgraduate Medical and Pharmaceutical Institute, Prague, to acquaint tuberculosis workers in key positions with modern methods of controlling the disease on a national scale within the framework of the general health services and to familiarize them with recent knowledge in epidemiology and managerial sciences. The three-month course in Prague (in English) was followed by a month of field training in India and Sri Lanka. Provided—fellowships for 17 physicians from 13 countries, the services of lecturers (including WHO staff members), and supplies and equipment.

0113.2 International course in the epidemiology and control of tuberculosis, Rome (22 Feb.-3 June 1972) R UNDP—The eleventh of a series of courses started in 1962 and organized in cooperation with the Carlo Forlanini Hospital, Rome, to acquaint tuberculosis workers in key positions with modern methods of controlling the disease on a national scale within the framework of the general health services and to familiarize them with recent knowledge in epidemiology and managerial sciences. The 10-week course in Rome (in French) was followed by a month of field training in Turkey. Provided—fellowships for 13 physicians from 12 countries, the services of lecturers (including WHO staff members), and supplies and equipment.

0172 Field research on special epidemiological problems of malaria (1962-75) R VM—To study all aspects of epidemiology of malaria in a savanna area of Africa; to prepare from the baseline data so obtained a mathematical model which will assist in indicating the attack measures of choice aiming at the interruption of transmission of malaria and against which the results obtained may be assessed; to recommend the future approach to malaria control in savanna areas of Africa; and to provide training facilities for research and laboratory workers on the methods and techniques applied in this project.

0190 Leprosy/BCG trial, Burma (1964-74) R—To carry out a trial to assess the value of BCG vaccination in the prevention of leprosy in the child population and obtain information on epidemiology, immunology, bacteriology, therapy and clinical aspects of leprosy.

0228 Seminars and courses in cholera control (1965-) R UNDP—The following took place during the period under review:

Accra (7-25 Feb. 1972)—A course (in English) to provide recent information on clinical and bacterial diagnosis, treatment, epidemiological features, surveillance, and control of cholera. Provided—a consultant, the services of two staff members, the cost of attendance of 13 participants from 12 countries, and laboratory supplies.

Bamako (28 Feb.-10 March 1972)—A course (in French) dealing with the same subjects as the course in Accra. Provided—two consultants, the services of three staff members, the cost of attendance of 15 participants from 12 countries, and laboratory supplies.

Malaysia and Singapore (11-18 Nov. 1972)—A seminar (in English) for senior public health administrators (including many at ministerial level) from 20 countries. Provided—a consultant, the services of two staff members, and the cost of attendance of the participants.

Rio de Janeiro (27 Nov.-8 Dec. 1972)—To provide recent information on diagnosis, treatment, surveillance and control of enteric infections, especially cholera, because of the threat of cholera spreading to the area. Training was given in English and Spanish. Provided—three consultants, the services of two staff members, the cost of attendance of 17 participants from 10 countries in the Americas, and laboratory equipment.

0234 Economic Commission for Africa (1964-) R—WHO is providing a sanitary engineer to assist the Economic Commission for Africa on the environmental health aspects of its economic and social development programmes.

0266 Field investigations in filariasis (1968-) R—To carry out applied research on problems of major importance in regions where filariasis is most prevalent. Investigations are made by consultants representing various disciplines (e.g., epidemiology, parasitology, entomology, vector ecology, medical pharmacology, and seroimmunology), working individually or in groups.

0270 Anopheles Control Research Unit No. 1, Kaduna, Nigeria (1960-) R—To carry out hut trials and village-scale field trials of new insecticides of potential value in malaria eradication and perform research on the ecology, biology and control of anopheline mosquitoes.

0273 Seminars in Psychiatric Diagnosis, Classification and Statistics: Seventh seminar, Tokyo (8-14 Dec. 1971); Eighth seminar, Geneva (28 Aug.-4 Sept. 1972) R—To achieve international agreement among psychiatrists and other health personnel of different countries on psychiatric diagnosis, classification and statistics.

The subject of the seventh seminar was the standardization of psychiatric diagnosis, classification and statistics of personality disorders and drug addiction. It was attended by 12 experts who have been collaborating in the programme since its inception and by 15 psychiatrists from 11 countries in the South-East Asia and Western Pacific Regions.

At the eighth seminar, 25 participants from 11 countries reviewed the work done over the past seven years and gave an outline of priorities for the future.

0276 Cholera control team (1964-) UNDP—To render emergency assistance to Member States in controlling cholera outbreaks and to help them to develop their short-term and long-term control programmes by training their personnel in different aspects of cholera; and to assist in the local production of cholera vaccine and rehydration fluid in laboratories where the facilities exist, and in improving sanitation.

0287 Advanced training course in diagnosis, treatment and prevention of major cardiovascular diseases, Copenhagen (4 Jan.-30 June 1972) VD—To train young physicians, primarily those from the developing countries, in cardiology. The course covered diagnostic methods, prevention, treatment and rehabilitation of cardiovascular disease patients, and the instruction was adapted to the needs of communities in developing countries. There were nine participants from as many countries. Provided—nine lecturers, including three staff members, and fellowships for the participants.

0306 Aedes Research Unit, Bangkok (1966-) R—To carry out research on the ecology and population dynamics of the *Aedes* vectors of haemorrhagic fever and dengue, particularly *A. aegypti* and *A. albopictus*, with the objective of developing effective methods of interrupting transmission of these diseases; also to carry out field trials on the control of *A. aegypti*, using organophosphorus, carbamate and other insecticides and biological control procedures; and to examine new techniques which are now only at an experimental stage.

0308 Epidemiology and biology of mental disorders (1971-) R—To assist programmes of research in the epidemiology and biology of mental disorders and to work with the WHO Regions in evaluating the effectiveness of mental health services and in training personnel.

0374 Community water supply: Consultant services (1965-) UNDP—To advise governments on the development of community water supplies. The work includes assessment of needs and resources, stimulation of the establishment of national programmes, advice on technical, managerial, organizational, legislative and budgetary aspects of community water supplies

and, where necessary, assistance in the preparation of formal requests to UNDP for the financing of pre-investment surveys and to the International Bank for Reconstruction and Development or other international or bilateral sources of investment funds, in connexion with the financing of water supply systems.

0403 Anopheles Control Research Unit No. 2, Kisumu, Kenya (1966-) R VM—To carry out extended field evaluation of insecticides for use in malaria programmes.

0455 Course for teachers of immunology in medical schools, Copenhagen (9-29 April 1972) VD—To acquaint teachers of immunology in medical schools with new developments in the field. The course was held at the Institute for Experimental Immunology, University of Copenhagen. Provided—13 lecturers and the cost of attendance of 20 trainees from 17 countries.

0458 Cancer control (1968-) R—To assist research programmes in different areas that are important for cancer control, including the evaluation of certain methods for treatment and early detection of cancer, definition of high-risk population groups, education, and development of internationally acceptable standardized methodology for recording medical data on oncological patients.

0465 International pilot study of schizophrenia (1971-) VR (National Institute of Mental Health, United States of America) (Field research centres in Aarhus (Denmark), Agra (India), Cali (Colombia), Ibadan (Nigeria), London, Moscow, Prague and Washington, D.C.)—To develop reliable methods for the identification and assessment of functional psychiatric disorder, particularly schizophrenia, and for the study and description of the cause; and to produce simple and reliable instruments for identification and assessment in preparation for large-scale investigations of social, cultural, biological and genetic factors that can cause, influence or prevent schizophrenia and for large-scale epidemiological studies of mental disorders.

0467 Special studies in virology, Africa (1968-) R—To conduct research on virus problems, collect and disseminate information, train local personnel, provide facilities for visiting scientists, and provide limited facilities for the diagnosis of virus diseases.

0469 Sanitary engineering centre, Rabat (1969-78) R VD—To assist in developing a centre for advanced and postgraduate training of French-speaking sanitary engineers from countries of the African, European, Eastern Mediterranean and Western Pacific Regions.

0475 Assistance to national radiation health programmes (1968-72) R—To assist governments in planning and implementing radiation health programmes and in training national personnel. Provided—a medical officer and a medical physicist.

Through visits to radiological institutes and authorities and attendance at national and regional scientific meetings and training courses, advice was given on radiation protection, particularly in radiation medicine, on planning of services, dosimetry and calibration of dosimeters, and problems of radiodiagnosis and radiotherapy.

A first review of the project showed in 1970 that particularly the physical and technical aspects should be promoted in countries of the Western Pacific and South-East Asia Regions, and the medical officer was accordingly replaced by the medical physicist at that juncture.

Postal services for comparison of doses in cobalt-60 therapy and film badge services for the monitoring of radiological personnel were provided at the regional level under this project.

0478 Development of research and training in immunology (1967-) R—To advise on training, organize courses in immunology and immunological techniques, and to collaborate in research and in developing regional training centres for research in immunology, especially as related to parasitic and other tropical diseases.

0498 Joint FAO/WHO Training Centre for Meat Inspectors, Athi River, Kenya: Seventh course (19 Jan.-18 June 1972) VD—To train personnel from African countries in the hygienic handling and inspection of meat. In addition to covering national and international aspects of meat control, the course touched upon meat transport and trade, veterinary administration, and animal diseases. WHO nominated one fellow and took part in the preparation of the course.

0521 Anaesthesiology course, Copenhagen (Jan.-Nov. 1972) VD—A course similar to those held yearly since 1951 at the Anaesthesiology Training Centre, Copenhagen, for training medical personnel. Provided—fellowships for 13 trainees from as many countries.

0522 Refresher course in anaesthesiology, Copenhagen (June 1972) VD—A course, the ninth of a series, for WHO trainees having attended one of the annual courses at the Anaesthesiology Training Centre, Copenhagen. Provided—fellowships for 12 trainees from as many countries.

0528 East Africa Aedes Research Unit, Dar es Salaam (1968-) R—To study the ecology, behaviour and distribution of the urban and peri-urban mosquito vectors of yellow fever in East Africa.

0529 Research Unit on the Genetic Control of Mosquitos, India (1969-) R VR—To conduct research into the feasibility of controlling *Culex fatigans* and *Aedes aegypti* on an operational scale by genetic manipulation.

0537 Seminar on Methods of Epidemiological Surveillance of Communicable Diseases, including Zoonoses and Foodborne Diseases, Nairobi (9-20 Oct. 1972) R—To enable senior epidemiologists and veterinary public health or animal health specialists to discuss the basic concepts and the methodology of the surveillance of communicable diseases, including the zoonoses and foodborne diseases. There were 31 participants from 27 countries. Provided—lecturers, three temporary advisers, the cost of attendance of the participants, and the services of staff members.

0539 Seminars on smallpox surveillance and assessment (Sept.-Nov. 1972) R—Officers responsible for smallpox eradication programmes and WHO project staff in countries in the Eastern Mediterranean and South-East Asia Regions attended three intercountry seminars dealing in particular with the reporting and surveillance aspects of the programmes. The first seminar was held in Addis Ababa from 18 to 23 September 1972, with participants from four countries of the Eastern Mediterranean Region; the second in New Delhi from 30 October to 3 November 1972, with participants from Bhutan and three countries of the South-East Asia Region; and the third in Karachi from 14 to 18 November 1972, with participants from four more countries of the Eastern Mediterranean Region.

0546 Assistance in epidemics (1971-) R VC VS—To assist countries where epidemics of communicable diseases occur, or threaten to occur, by providing advice, facilities for diagnosis and assessment, and emergency supplies of vaccine, and meeting other requirements.

0547 Smallpox surveillance and assessment team (1970-) R VS—To carry out regular independent assessments of the individual programmes in smallpox endemic countries; to

identify, as the programmes progress, the specific operational problems and assist health administrations in carrying them out; to collect further information that is required for the future development of the global programme, and to conduct special epidemiological studies with a view to defining the patterns of transmission of residual smallpox, particularly with reference to nomads and other migrant groups.

0559 Iran/WHO International Epidemiological Research Centre (1968-) R—A centre, set up by the Government of Iran in collaboration with WHO, for multidisciplinary research in epidemiology and communications science. Consultation on research between the relevant scientific organs of the Government of Iran and WHO is carried out through the centre, which proposes, implements and coordinates research projects, and provides research teams with the necessary technical and operational facilities.

0565 Field research on cardiovascular diseases (1968-73) R—To undertake investigations in specific areas of Africa and Asia where natural conditions are suitable for studying the etiology of ischaemic heart disease and primary diseases of the heart but where personnel for undertaking such work are lacking; and to assist in the cardiovascular research training programme. The team provided under this project, which is composed of a cardiologist, an epidemiologist and a technician, works in cooperation with the WHO Research and Training Centre for Cardiovascular Diseases, Kampala, on research into the prevalence and control of valvular heart disease in primary school children in Uganda and into cardiovascular status in elderly Africans.

0567 Immunology: Courses at international reference centres (1969-) R—The fourth of a series of courses was given at the WHO International Reference Centre for Immunoglobulins, Lausanne (Switzerland), from 4 to 6 September 1972. The course, which was given in English, dealt with cell-mediated (type IV) immunity. Provided—10 temporary advisers and the cost of attendance of 11 participants from nine countries. Five places were reserved for local students.

0577 Japanese Encephalitis Vector Research Unit, Republic of Korea (1969-) R—To investigate the distribution, density and ecology of the mosquito vectors of Japanese encephalitis, carry out observations on the epidemiology of the disease and the interrelationship of the vectors, man and animals, and investigate the reservoirs of infection.

0579 Exchange of teaching personnel (1972-) R—To enable teachers of medical and allied health sciences to exchange experience and discuss teaching problems.

0581 Course in epidemiology and control of communicable diseases (in English), Moscow and Alexandria (Sept. 1972-Jan. 1973) R UNDP—To train medical officers in basic practical epidemiology, in particular for the purpose of establishing a cadre of epidemiologists in communicable diseases in the developing countries. The course was held in Moscow from 6 September to 10 November 1972, with field practice visits to Erevan and Stavropol; lecturers from the USSR assisted with the course, together with WHO staff members. The course continued in Alexandria from 13 November 1972 to 8 January 1973; diseases prevalent in the tropics and subtropics, not dealt with in the Moscow part of the course, were discussed, and field training was given. Provided—the cost of attendance of 12 participants from 10 countries.

0594 Travelling seminar on the collection and utilization of statistical information in the planning and evaluation of health services at intermediate and local levels (in French), Finland and Union of Soviet Socialist Republics (5-24 June 1972) R—To

enable leading specialists in national health services to familiarize themselves with the collection of various health statistical data and their practical utilization in the work of the health services. There were 15 participants from 12 countries, and a staff member from the Regional Office for South-East Asia attended. Provided—consultants and the cost of attendance of the participants.

0616 Course on control of coastal water pollution (31 July–25 Aug. 1972) VD—To train personnel in up-to-date techniques for controlling pollution of coastal waters and coastal areas. Provided—19 lecturers, fellowships for 14 participants, and the services of a staff member.

0618 Course on vector and rodent ecology, Bangkok (16–27 Oct. 1972) VD—To present the principles of and practical information on the ecology and control of rodents of public health importance (particularly rats) and to demonstrate modern methods of control, with special reference to conditions in South-East Asia; also, to review the biology of the most important urban mosquito and housefly populations and demonstrate methods for their control, and to give guidance for the organization of municipal vector control services. Provided—lecturers, the cost of attendance of 25 participants from nine countries, and the services of two staff members.

0624 Course on the quality control of drugs, Copenhagen (10 April–6 May 1972) VD—To assist developing countries in promoting improvement of the quality control of drugs. The course covered principles for the basic training of pharmaceutical analysts, the legislative basis for inspection of pharmaceutical manufacturing firms, the methodology of sampling, systems of numbering batches, and storage techniques. Provided—fellowships for 24 participants from 23 countries.

0637 Seminar on the training of radiographers and other technical staff in the medical use of ionizing radiation, Teheran (4–15 Dec. 1971) R (IAEA)—To develop a standard system that can be modified according to the needs of different countries, for training technical staff in X-ray diagnosis, radiotherapy and nuclear medicine. There were 15 participants from 11 countries and an observer from one. Provided—four temporary advisers, the cost of attendance of the participants, and the services of staff members. A temporary adviser and a staff member from IAEA assisted with the seminar.

0642 United Nations Social Defence Research Institute (1971–) R (UN Social Defence Research Institute)—To collaborate in programmes related to mental health legislation and forensic psychiatry, with specific reference to mental health aspects of prevention of crime and treatment of offenders.

0658 Research on the epidemiology and methodology of control of schistosomiasis in man-made lakes (1971–) UNDP—To undertake research for the development of effective and economical methods of schistosomiasis control in man-made lakes; in particular (i) to study the ecology and epidemiology of schistosomiasis in such lakes; (ii) to carry out preliminary control trials in the field; (iii) to make recommendations on methods of schistosomiasis control in man-made lake conditions; and (iv) to provide training in schistosomiasis research and control under those conditions.

0660 Comprehensive health planning research, Colombia (1970–) R VR PR (Government of Colombia)—To make the benefits of good health planning more accessible to WHO Member States. To accomplish this a project has been started in Colombia which will attempt to create, through gradual modification of an existing health planning system, an improved planning system that will utilize resources more effectively.

0671 Seminar for National Programmes on Problems of Alcohol and Drug Dependence (11–30 Sept. 1972) R—A seminar was held in Stockholm, in Belgrade and Zagreb (Yugoslavia) and in Lausanne (Switzerland) to encourage the review of national and local policies and programmes on alcohol and drug dependence by responsible authorities, to facilitate the exchange between authorities in different countries of information on methods of organizing and providing services for prevention and treatment, and to promote the improvement of such services. There were 24 participants from 19 countries. Provided—five temporary advisers, fellowships for 19 participants, and the services of two staff members.

0673 Human environment (1970–75) R—To cooperate with the United Nations in its programme relating to the human environment and with UNESCO in respect of its “Man and the Biosphere” programme.

During the period under review, WHO assisted with the preparations for the United Nations Conference on the Human Environment, held in Stockholm in June 1972.

0674 Methodological study on behavioural and operational components of health intervention programmes, Rotterdam (Netherlands) and Kaunas (Lithuanian SSR) (1970–) R VR—To investigate methodological problems involved in a health intervention programme, using cardiovascular diseases as the intervention vehicle, with the specific objective of ascertaining the factors that determine (i) which individuals among those identified in a population as being at risk will participate in an intervention programme; (ii) successful adherence to the programme; (iii) the relationship of the cost of undertaking such a programme to the benefits in terms of the proportion of individuals who will be at less risk through intervention, by developing a cost-effectiveness model.

This study is being carried out in cooperation with two research teams, one from the Municipal Health Department of Rotterdam, the other from the Kaunas Medical Institute. WHO's contribution consists of making available epidemiological, sociological and statistical advice and coordinating the data-processing methods used in both study areas.

0687 Malaria conference for countries where time-limited malaria eradication is impracticable at present, Brazzaville (30 Oct.–10 Nov. 1972) R—To discuss the means available for reducing the effects of malaria on the health and economy of peoples of the countries which, for financial or administrative reasons, are as yet unable to eradicate the disease. There were participants from 31 countries and representatives from UNDP, UNICEF, the Organization of African Unity, the Commission of the European Communities, the East African Community, the Organization for Coordination and Cooperation in the Control of Major Endemic Diseases, the Organization for Coordination in the Control of Endemic Diseases in Central Africa, the *Office de la Recherche Scientifique et Technique Outre-Mer*, the United States Agency for International Development, and the Center for Disease Control (United States Public Health Service). Provided—two consultants, the cost of attendance of the participants, and the services of staff members.

0689 Project systems analysis (1969–) R—To apply the techniques of systems analysis and action research to providing a detailed, consistent methodology for the formulation of development projects; identifying management techniques for development projects so as to make them susceptible of monitoring, control and evaluation; specifying information system requirements for the support of project management; and proposing methods and mechanisms for propagating the development project concept, methodology and supporting systems.

0692 Refresher course in medical rehabilitation, Holte, Denmark (29 May-17 June 1972) VD—To provide intensive training for medical rehabilitation doctors. Provided—two temporary advisers and fellowships for 15 trainees.

0693 Course on modern methods of management of nursing services, Copenhagen (3 Sept.-14 Oct. 1972) VD—To assist in improving the organization and management of the nursing component of health services by strengthening the technical and managerial skills of nurses in administrative positions who are concerned with the planning, delivery and evaluation of nursing services. Provided—two temporary advisers and the cost of attendance of the 20 participants.

0696 Course in malacology, Copenhagen (18 Sept.-13 Oct. 1972) VD—To give training in snail identification and in methods for the rearing of snails in the laboratory and their infection with schistosomes. The course was held at the Danish Bilharziasis Laboratory, which is the WHO Snail Identification Centre. Provided—a temporary adviser, the cost of attendance of nine participants from nine different countries, and the services of a staff member.

0701 Seminar on Trypanosomiasis, Kinshasa (23 Oct.-1 Nov. 1972) R (FAO)—To provide an opportunity for those in charge of national trypanosomiasis programmes to discuss problems of epidemiology and the most recent developments in research, control, diagnosis and organization of services. There were 20 participants from 15 countries and 10 observers. Provided—five temporary advisers, the cost of attendance of the participants, and the services of four staff members. A staff member from FAO assisted with the seminar.

0703 Group of Experts on the Scientific Aspects of Marine Pollution, fourth session, Geneva (18-23 Sept. 1972) R—The functions of the group are to advise the sponsoring organizations (the United Nations, FAO, UNESCO, IMCO, WMO, IAEA and WHO) on the scientific aspects of marine pollution, especially those of an interdisciplinary nature; to advise on the establishment of effective international and intergovernmental means for the control of marine pollution; and to consider specific questions that may be put to it by the executive head of any sponsoring organization or by any Member State.

The fourth session of the Group was concerned mainly with (i) bioassay and other techniques for evaluating lethal and sublethal effects of pollutants on marine organisms; (ii) transport and dilution of pollutants and marine pollution monitoring; (iii) management of waste disposal; and (iv) consequences of the human perturbation of the deep-sea floor. The Group also discussed principles for developing coastal water quality criteria. Provided—services of two consultants, four temporary advisers and two staff members.

0709 Seminar on Considerations of Human Ecology in Environmental Health Programmes, Geneva (31 July-9 Aug. 1972) R—To discuss the biophysical and sociocultural environment of man and the introduction of the concept of human ecology into the planning of environmental health programmes. Provided—four temporary advisers and the cost of attendance of 18 participants from 16 countries.

0712 Course in epidemiology (in French), Paris, and Bobo-Dioulasso (Upper Volta) (Oct. 1972-Feb. 1973) R—To train French-speaking medical officers in basic practical epidemiology, in particular for the purpose of establishing a cadre of epidemiologists in communicable diseases in the developing countries. The course was held at the Institut Alfred Fournier, Paris, from 16 October to 22 December 1972 and is continuing at the Centre Muraz, Bobo-Dioulasso, from 3 January to 23 February

1973. Provided—lecturers and course costs and (under other projects) the cost of attendance of 13 participants from nine countries.

0714 Seminar on Planning, Organization and Administration of Medical Rehabilitation Services, New Delhi (4-15 Sept. 1972) R—To enable medical doctors responsible for medical rehabilitation services in developing countries to study the planning, organization and administration of such services, to help them in establishing efficient comprehensive services in their own countries. The seminar was held at the All-India Institute of Medical Sciences and the Head of its Department of Orthopaedic Surgery acted as seminar director. Provided—two consultants, two temporary advisers, the cost of attendance of 16 participants from 14 countries, and the services of staff members.

0715 Assistance to national occupational health programmes (1972-) R—To assist governments in planning and implementing occupational health programmes and in training national personnel.

0716 Course on nutrition in maternal and child health, Paris and Rabat (12 April-4 May 1972) R (International Children's Centre)—To strengthen the knowledge of nutrition of physicians responsible for the health of children in African countries where French is spoken. Provided—a consultant, fellowships for 13 participants from 11 countries, and the services of three staff members.

0718 IAEA/WHO Seminar on Training and Education in Medical Physics, Kiel, Federal Republic of Germany (10-21 April 1972) R VD—To review the training in medical physics given in different parts of the world with a view to outlining internationally acceptable curricula. The seminar, which was organized jointly by IAEA and WHO, discussed the needs, aims and methods of work for training in medical physics on the basis of 46 working papers presented by staff members and temporary advisers of the two organizations; data on the availability of facilities and staff in different countries and recommendations for the organization of training and length and content of courses were examined. A report was prepared and circulated in order to obtain the final agreement of participants on internationally acceptable recommendations. There were 20 participants from 16 countries. Provided—four temporary advisers and the services of three staff members.

0721 Training course on the organization of genetic counselling services, Ferrara, Italy (9-22 Oct. 1972) R—To acquaint geneticists and physicians with the organization of genetic counselling services. Provided—nine temporary advisers, fellowships for 12 trainees from 11 countries, and the services of a staff member.

0722 Training course in biological standardization, London (3-28 July 1972) R (London School of Hygiene and Tropical Medicine) (Various technical institutions in the United Kingdom)—To provide practical training in tests used in the control of potency and safety of certain immunological biological products used in medicine; to give general instruction in the need for and value of developing national activities for the control of biological substances used in prophylactic and therapeutic medicine; and to provide the opportunity for exchange of information on common problems and difficulties in the technical aspects of control. Provided—the cost of attendance of 12 participants from 12 different countries, course costs, samples of certain international biological standards and reference preparations, and documentation. A WHO staff member served as one of the teachers.

0725 International Occupational Safety and Health Information Centre (1963-) R—To support the Centre, which was started

by ILO and which provides references to and prepares abstracts from the literature on occupational health and safety.

0752 Meetings of Directors of institutions collaborating with the WHO International Reference Centre for Wastes Disposal, Dübendorf, Switzerland (13-17 Nov. 1972) R—The meeting, held at the Centre's host institute, the Federal Institute for Water Resources and Water Pollution Control, was attended by the Directors of 18 of the institutions collaborating with the Centre. The topics discussed included the transfer of technology through dissemination of information and the expansion of training programmes; research promotion; rural wastes disposal; the economic implications of wastes disposal, and the health aspects—particularly the assessment of conventional and new treatment processes in the removal of bacterial and viral contamination.

0763 Course in human genetics for teachers in medical schools, Odense, Denmark (6-26 Nov. 1972) VD—To familiarize teachers in medical schools with new developments in human genetics, such as those in the genetics of the human leukocyte system and of immunoglobulins, in human chromosome mapping, and in the prevention of genetic disorders. The course, held at the University Institute of Clinical Genetics, Odense, Denmark, had 15 participants from four Regions. Provided—four consultants, the cost of attendance of the participants, and the services of a staff member.

0785 Training course in X-ray diagnosis and endoscopic diagnosis of early stomach cancer, Tokyo (Dec. 1971) R—To discuss the work of the International Reference Centre for Evaluation of Methods of Diagnosis and Treatment of Stomach Cancer, particularly the diagnostic procedures to be used in work in collaborating centres. The three-week course was held at the International Reference Centre in the National Cancer Centre, Tokyo, and intensive practical training was given to the 14 participants from collaborating centres in different countries. Provided—the cost of attendance of the participants.

0787 Research in the epidemiology and control of single diseases (1972-73) R—To study single diseases with well-defined mechanisms, using the disciplines of epidemiology, sociology, demography, mathematics, statistics, operations research and computer technology, with the aim of improving knowledge of their dynamics for better planning and implementation of control; to prepare study designs and research protocols with special emphasis on multidisciplinary uses; to design detailed systems for data collection, analysis, interpretation and presentation; and to develop epidemiological models of transmission processes for varying health status, and test their usefulness in the planning of control activities.

0788 Disability in the productive age (1972-73) R—To assess the prevalence of disability, its causes and the associated social and environmental factors, through home interviews and detailed examination of a sample of disabled persons between the ages of 35 and 54 in Belgrade, Yugoslavia.

0789 Course for clinical instructors in physical therapy, Holte, Denmark (11 Sept.-9 Dec. 1972) VD—To provide training for qualified physical therapists teaching in hospitals or at schools of physical therapy. Provided—a temporary adviser and fellowships for 19 participants.

0794 Study on the therapeutic effectiveness of maintenance in the management of narcotic-dependent persons (1972-) UNFDAC—To develop guidelines for the collection of comparable data from selected countries on the therapeutic effectiveness of maintenance in narcotic-dependent persons.

0796 WHO/UN/ILO Mission to Thailand on Drug Abuse Control (1972) UNFDAC—A mission visited Thailand to assist in the preparation of a draft plan of operation for treatment and rehabilitation aspects of the programme of drug abuse control which is supported by the United Nations Fund for Drug Abuse Control.

0797 Meeting of investigators on immunological problems in leprosy research, New Delhi (30 Nov.-5 Dec. 1972) R—A meeting was held at the Regional Office for South-East Asia to follow up developments in the application of basic immunological principles to research on leprosy since the last meeting of investigators in 1970. There were 11 participants (temporary advisers) from eight countries.

0798 Course on the nursing team approach to rural health problems, Helsinki (20 Aug.-30 Sept. 1972) VD—To assist countries in strengthening nursing and midwifery services for rural areas. The course was specially designed for teams of nurses or nurse/midwives responsible for assessing major health problems that involve their services, for defining the functions and responsibilities of each category of nursing personnel working in rural health services, and for planning, developing, implementing and evaluating the training and supervision programmes for those workers and their teachers and supervisors. There were 21 participants from countries in the African and Eastern Mediterranean Regions. Provided—a temporary adviser and the cost of attendance of the participants.

0892 Symposium on the Prevention of Ischaemic Heart Disease: Metabolic Aspects, Madrid (2-4 Oct. 1972) VD (Scientific Council on Arteriosclerosis and Ischaemic Heart Disease of the International Society of Cardiology) (*Medical Tribune International*)—To make a critical review of ongoing studies on prevention of ischaemic heart disease; to discuss relevant investigations on metabolic processes associated with the development of atherosclerosis and ischaemic heart disease (e.g., lipid and carbohydrate metabolism, trace minerals; adequate nutrition for optimum growth and physical and mental development of children); and detection and care of individuals at risk from myocardial infarction; and to outline further research to be undertaken in children, adolescents and adults. Provided—cost of attendance of 22 participants from 12 countries.

0893 Meeting on analytical methods and data processing in air pollution monitoring, North Carolina, USA (13-17 Nov. 1972) VD—At a meeting held in the International Reference Centre on Air Pollution Control at the National Environmental Research Center, Environmental Protection Agency, Research Triangle Park, North Carolina, USA, proposed methods for the routine measurement of common air pollutants—including sulfur dioxide, carbon monoxide, ozone, oxides of nitrogen, and suspended particulate matter—and methods of comparison for each of these pollutants, were agreed, guides on processing and analysis of relevant data were finalized, and the publication of methods and procedures in a monograph subject to periodical review was recommended. There were 16 participants from 12 countries, in addition to staff of the Environmental Protection Agency. Two WHO staff members and a consultant assisted with arrangements for the meeting.

0894 Meeting on health criteria for quality of recreational waters, with special reference to coastal waters and beaches, Ostend, Belgium (13-17 March 1972) VD—To review existing health criteria and standards for the quality of recreational waters, especially of coastal waters and beaches, and define guides to coastal water quality. Provided—the cost of attendance of 13 participants (temporary advisers) and the services of four staff members.

0896 Meeting on environmental health criteria and standards, Geneva (20-24 Nov. 1972) VD—To review the need for environmental criteria and standards and their application in control programmes, and to discuss the scope and priorities of a WHO programme for the development of environmental health criteria. The 31 participants in the meeting agreed on priorities for the programme and recommended measures for its implementation, using the experience gained in activities completed or under way at the national and international levels. Provided—five staff members and supporting services for the meeting.

1001 Development of family planning activities—country appraisals (1970–) UNFPA—To assist in the development of family planning activities within health services, and to participate in interagency missions on family planning and population dynamics.

1002 Advisory team on health aspects of family planning (1970–) UNFPA—To develop guidelines for the provision of family planning within health services, and to build up expertise within WHO and national health administrations.

1003 Development of family planning aspects of maternal and child health activities (Maternity-centred family planning) (1970–) UNFPA—To promote maternal and child health through the improvement of maternity, infant and child health care with emphasis on the provision of family planning in connexion with the maternity cycle.

1008 Strengthening of health education services to support health aspects of family planning (1970–) UNFPA—To help health authorities to strengthen their health education services in support of family planning activities. The project includes (i) assistance in planning, utilizing and evaluating such services; (ii) examination of ways of strengthening family life education and related school health education; (iii) provision of short courses, workshops, seminars, and in-service training; and (iv) strengthening of the health education element in other WHO-assisted programmes concerned with the health aspects of family planning. Assistance is also being provided in developing collaborative activities in health education with other organizations of the United Nations system and with nongovernmental organizations.

1019 Research on health aspects of family planning and population dynamics (1970–) UNFPA—To stimulate and coordinate operational research and administrative and epidemiological studies of family planning in health services, as well as studies of the health aspects of population dynamics.

1020 Research in health education and behavioural sciences relevant to family planning (1971–) UNFPA—To assist in planning and developing the research in health education and related social sciences that is essential for the planning of measures to enlist more effective cooperation of the public in the health aspects of family planning and related health services.

A consultation was held in Washington, D.C. from 11 to 17 April 1972 to develop a guide for the determination of the educational component in family planning programmes. There were 13 participants (temporary advisers) from seven countries in the Region of the Americas, and two consultants, and two staff members attended.

1021 Study on levels, trends and differentials of fetal, infant and childhood mortality (1970–75) UNFPA (UN)—To carry out, jointly with the United Nations, an investigation into levels, trends and differentials in fetal, infant and early childhood mortality.

A joint meeting was held in Geneva in January 1972, with participants from seven countries, to establish plans for the study of perinatal mortality according to social and biological effects.

1022 Combined ad hoc surveys on fetal, infant and early childhood mortality and fertility patterns (1970–75) UNFPA—To provide estimates of levels and trends and differentials of fetal, infant and early childhood mortality in relation to fertility patterns and to test statistical methods and techniques suitable for carrying out the surveys in selected countries.

1023 Registration of pregnancies (1970–74) UNFPA—To establish a registry of pregnancies and assess the various outcomes of these, namely, early fetal death corresponding to abortion, in addition to the usually recorded late fetal death and live birth.

The project is to be carried out in a few countries where most of the pregnant women receive antenatal care.

1025 Educational role and functions of health personnel in health aspects of family planning (1971–) UNFPA—To study the educational role and functions of health personnel in health aspects of family planning, and to consider the implications of the findings for the training of health workers in health education.

A workshop on health education for family health and well-being was held in Hammamet, Tunisia, from 16 November to 15 December 1972, for participants from Algeria and Tunisia, in order to ensure better integration of health education in the health programmes designed for family wellbeing, particularly those concerned with maternal and child health and family planning. It was attended by 32 senior supervisory staff of health services and closely related programmes with responsibilities in the fields of maternal and child health and family planning. Provided—three consultants, two temporary advisers, the cost of attendance of the participants, and the services of two staff members.

1028 Evaluation of family planning activities within health services (1970–74) UNFPA—To assist governments in evaluating family planning activities in the context of health services, including collection of the necessary information, development of assessment methods, and field studies to test those methods.

1029 Research team for evaluation of fertility control methods (1972–76) UNFPA—To advise on clinical trials of fertility regulating agents and the assessment of their results and to conduct and coordinate such trials in collaboration with local staff; to plan and carry out research on methods for the evaluation of the use, effectiveness, and side effects of such agents; and to assist in relevant training programmes.

1030 Review and appraisal of health education services (1971–) UNFPA—To assist in reviewing the health education services required to support family planning activities within health services, and in developing appraisal methods and procedures; to exchange information on the subject; and to discuss objectives, requirements, scope and methods for the health education services.

A meeting was held in Lima, Peru from 12 to 22 July 1972 to revise a guide for examination of the educational component in family planning drafted at an earlier consultation, and to plan the preliminary testing of the guide in selected countries. Provided—four consultants and the services of a staff member.

1031 Teaching of human reproduction, family planning and population dynamics in medical schools (1971–) UNFPA—To develop suitable methods and materials for the teaching of human reproduction, family planning and population dynamics as subjects in medical schools, and to assist such schools in integrating the subjects into the curriculum.

A course in medical documentation with special reference to family health was held in Geneva from 23 October to 3 November 1972, to introduce senior medical librarians and documents

officers from developing countries to modern documentation methods in biomedicine with special reference to family health and with emphasis on the use of large-scale computer-based systems for automatic retrieval of information. Nine trainees from eight countries and five regional office librarians attended the course. Provided—six temporary advisers and supporting services.

1033 Strengthening of teaching of human reproduction, population dynamics and family planning in nursing and midwifery education (1971–) UNFPA—To assist in strengthening education and training programmes for nursing and midwifery personnel in family planning; to promote relevant technical publications; to review teaching material; to develop methods of evaluating the effectiveness of teaching for different levels of nursing personnel; and to prepare teachers.

1035 Health education in schools, including family life education (1971–) UNFPA—To promote the integration of health aspects of family life education, population dynamics and related areas in human biology, social studies, family planning, communications, and other relevant subjects, into health education projects.

A consultation organized jointly with UNESCO was held in Geneva from 7 to 13 December 1971 to discuss planning for health education of young persons and school-age children. There were 16 participants (temporary advisers) from 15 countries. Provided—a consultant and 10 of the temporary advisers for the consultation.

1036 Meeting on teaching of questions of human sexuality in schools for health professionals (13–19 Sept. 1972) UNFPA—To examine curricula and determine needs with regard to the teaching of questions of human sexuality to health professionals, and to recommend measures for the strengthening of teaching programmes accordingly. The meeting also attempted to identify (i) ways in which sexual attitudes and behaviour affect health and consequently the functions of medical and nursing personnel; (ii) the skills required for counselling and teaching in this field, with particular attention to such problems as unplanned pregnancy, venereal disease, and abnormal sexual behaviour; (iii) the extent to which schools of medicine and nursing are providing the necessary instruction; and (iv) the potential role of WHO in providing advisory services on the evaluation and improvement of instruction in this field. There were seven participants (temporary advisers) from as many countries, and observers from the International Federation of Gynecology and Obstetrics and the International Planned Parenthood Federation also attended. Provided—two consultants, the services of four staff members and supporting services.

1037 Short-term training programmes on the health aspects of family planning and population dynamics (1972–) UNFPA—To assist in the short-term training of various categories of health personnel in health aspects of family planning and population dynamics, including the organization of orientation courses and in-service and refresher training programmes.

A seminar on reproductive biology was held in Barcelona, Spain, from 16 to 20 October 1972 to stimulate interest in research on the biomedical aspects of reproduction. Topics included research on fertilization, implantation, ovulation, sex determination, and fertility control. There were approximately 100 participants from four countries. Provided—lecturers and supporting services.

1038 Short courses in family planning for nursing and midwifery personnel (1971–) UNFPA—To strengthen nursing and midwifery services in family planning, and to consider the

potential role of traditional birth attendants in family planning programmes,

1040 Workshops for national health statisticians on health aspects of population dynamics and measurement of family health (1971–74) UNFPA—To familiarize statisticians in key positions with statistical methods for the study of health and population; to determine the principal statistical issues involved in the planning, execution and evaluation of family health programmes; and to provide up-to-date information on developments in statistical methodology.

The second workshop took place in Teheran from 4 to 16 March 1972 with 15 participants from five countries of the Eastern Mediterranean Region and one of the African Region. The third was held in Bogotá from 12 to 25 April 1972 with 18 participants from 17 countries of the Region of the Americas. The fourth was held in Bangkok from 15 to 28 November 1972 with 15 participants from five countries of the South-East Asia Region.

1041 Teaching of human reproduction, family planning and population dynamics to auxiliary health personnel (1971–) UNFPA—To incorporate the teaching of human reproduction into the basic training of auxiliary health personnel.

1046 Health education material and communication media (1971–) UNFPA—To improve material for information and education and to plan the more effective use of communication media for community health service activities involving health aspects of family planning.

1047 Manual on fertility analysis (1971–) UNFPA—To prepare a manual on methods and techniques in health statistics relating to studies in human reproduction and in family planning programmes, with special reference to conditions in developing countries. The manual will deal with problems of collecting, estimating and adjusting basic data, the techniques useful for combined fetal, infant and early childhood mortality surveys and fertility surveys, evaluation methods for family planning programmes and other methods for evaluation of their impact on the health status of the population.

1048 Manual on morbidity and mortality analysis (1970–73) UNFPA—To prepare a manual on methods and techniques for the collection and analysis of numerical information on morbidity and mortality. The manual will deal with aspects of automatic data processing, population models in health statistics, the theory of competing risks, and other methods for evaluation of specific public health measures.

1065 Comparative pilot studies of statistical methodology and techniques in family planning programmes (1971–75) UNFPA—To test statistical methods and techniques for the collection, appraisal and analysis of quantitative information required in the planning, operation and evaluation of family planning programmes; to determine the needs for information in the various phases of programmes; to study the design of standard forms for data collection; and to investigate problems involved in the “feedback” of statistical information for policy decisions.

A preparatory meeting was held in Geneva from 16 to 20 October 1972 to discuss the detailed plan of operation, including the selection of countries to be included in the studies, topics to be investigated, and standard forms and procedures to be used.

1066 Investigation of urban-rural differentials of mortality (1972–74) UNFPA (UN)—To study urban-rural mortality differentials in communities at various stages of socioeconomic development on the basis of available national data; to stimulate and support such studies in selected countries where the data are not readily available; and to promote investigations of the

underlying causes of the observed differentials in various countries.

A preparatory meeting was held in 1972 with representatives of four European countries to advise on the implementation of the project.

1067 Consultation on statistical aspects of evaluating the impact of family planning on health, Geneva (9-13 Oct. 1972) UNFPA—Eleven advisers from nine countries met to discuss methods of assessing the impact of family planning on health, and define the related needs for statistical information and the problems of data collection and appraisal. They formulated guidelines for data collection and analysis, and recommended priorities for research.

1140 Research in education and training of health personnel for family planning programmes (1971–) UNFPA—To plan and initiate research in education and training of health personnel for family planning programmes, in collaboration with existing and planned training and research centres in the Regions.

1147 Development of health statistical activities in health aspects of human reproduction, family planning and population dynamics (1971–) UNFPA (UN)—To develop and test methods for the collection, improvement and appraisal of health statistical information essential for health planning and the evaluation of public health programmes; to obtain better information on morbidity and mortality patterns and on the health effects of family planning; to collect data for study of the interrelationship of health, population structure and socioeconomic development; and to establish a health statistics infrastructure that will provide essential data for the health administration.

A seminar on mortality analysis was held in Mamaia, Romania from 20 September to 3 October 1972 in cooperation with the United Nations. Provided—the cost of attendance of three participants and the services of three staff members and a temporary adviser. Also, a preparatory meeting was held in Geneva from 16 to 20 October 1972 to consider the feasibility of setting up health demography laboratories in selected countries lacking adequate vital and health statistical information and efficient vital statistics registration systems.

1148 Support to data processing centres (1971–74) UNFPA—To explore the feasibility of setting up regional data processing centres to assist countries in increasing the role of health statistics in studies of human reproduction and in family planning programmes.

A consultation on assistance to countries in processing of health statistics was held in Geneva from 21 to 24 March 1972 with five participants from four countries. The participants discussed the demands for assistance in data processing in connexion with demographic studies, and considered the preparation of a programme of missions to various countries to determine methods of assistance in health data processing.

1150 Consultation on health manpower statistics, Geneva (23-27 Oct. 1972) UNFPA—To compare population trends and health manpower needs and formulate guidelines for information systems on health manpower resources. The 10 participants discussed methodological and technical aspects of health manpower statistical analysis, and identified areas in which improvements can be made in the light of information on health manpower in the fields of population dynamics and family planning.

1151 Methodology of reporting and analysis of perinatal and maternal morbidity and mortality (1971–74) UNFPA—(i) To carry out studies with a view to establishing internationally

acceptable criteria, definitions, classifications and nomenclature both for morbidity and causes of death and for the medical procedures—preventive, therapeutic and diagnostic—related to the perinatal period; (ii) to propose a methodology for the registration of pregnancies; (iii) to propose a methodology for the collection and analysis of information on child and mother (with special reference to multiple causes of illness and death) in countries with a high doctor/population ratio and those with a low one; (iv) to propose a statistical methodology for measuring the survival probability of the immature fetus; (v) to carry out studies on the multifactorial causation of mortality as related to population dynamics; and (vi) to set up a reference centre to advise on and assist the above activities.

A consultation was held in Geneva from 12 to 18 April 1972 to prepare recommendations on the terminology and methods to be used in the collection of perinatal morbidity and mortality statistics. Arrangements were made for the trial of a draft international certificate of cause of perinatal death, and proposals were made for revision of chapters XIV and XV of the International Classification of Diseases. There were 12 participants from seven countries. Provided—supporting services and the assistance of four staff members.

A further consultation with 12 participants from seven countries was held in Bristol, England, from 25 to 27 September 1972 to adopt the recommended terminology and methods, as well as to define the terms used to describe birthweight for gestation age, and to assess the progress of studies of alternative forms of perinatal death certificate. The proposed revision of the relevant chapters of the International Classification of Diseases was further discussed. Provided—the services of two staff members.

1154 Pilot study on application of randomized response techniques to collection of data on health aspects of population dynamics (1971–74) UNFPA—To initiate studies in three or four countries on the collection of information on abortion, extramarital conception, etc.

1155 Study of influence of changing mortality on the life cycle of the family (1972–73) UNFPA (UN)—To investigate the influence of changing mortality at various stages in the development of the family in countries with relatively high mortality; and to compare this influence with other factors such as nuptiality and divorce so as to assess its relative importance.

1156 Cost/effectiveness studies of family planning programmes within the context of public health activities (1972–73) UNFPA—To clarify the concept of cost/effectiveness analysis as applied to family planning programmes carried out within the context of public health; to review existing methods of such analysis; and to formulate recommendations for research on promising methods.

1161 Application of stochastic models in the study of problems of human reproduction (1972–73) UNFPA—To review work on the application of stochastic models in the study of human reproduction in various countries; to consider their usefulness; to define the requirements for the development of sophisticated models; and to identify areas for further theoretical and practical studies.

1167 Study on curricula for the training of health statisticians in family planning statistics (1971–) UNFPA—To strengthen the professional training of health statisticians in family planning statistics, by identifying the changes that should be made in training programmes and formulating the appropriate guidelines, and by recommending other measures to improve family planning aspects of health statistics training.

1168 Training centre for exfoliative cytology and obstetrical and gynaecological pathology in relation to family planning programmes (1971-) UNFPA (Ford Foundation)—To develop a training centre for exfoliative cytology and obstetrical and gynaecological pathology in relation to family planning programmes, which will function in collaboration with interregional training centres. Cytology laboratory facilities are to be established in the countries from which trainees are drawn. It is intended to develop, in a number of countries with family planning programmes, expertise that may serve to provide advice to governments and carry out cytological monitoring of, for example, possible adverse side-effects of certain contraceptive methods.

1195 Health services development in Iran (1972-74) UNFPA—To discover and test better ways of solving multiple health

problems through an efficient national health delivery system. The staff assigned to the project (a systems analyst and a statistician) work in coordination with the Iran/WHO International Epidemiological Research Centre (project Interregional 0559), which provides an epidemiologist and an administrative officer for the project.

1212 World Population Year, 1974 (1972-74) UNFPA—To promote the family health component of activities planned under the auspices of World Population Year by means of public information and to create greater public awareness of the needs of family health and the means of its improvement; to explain the health aspects of family planning to authorities responsible for mass media, and to assist with the provision of accurate information.

ANNEXES

Annex 1

MEMBERS AND ASSOCIATE MEMBERS OF THE WORLD HEALTH ORGANIZATION

at 31 December 1972

At 31 December 1972 the World Health Organization had 135 Member States and two Associate Members. They are listed below, with the date on which each became a party to the Constitution or the date of admission to associate membership.

Afghanistan	19 April 1948	Haiti *	12 August 1947	Poland *	6 May 1948
Albania	26 May 1947	Honduras	8 April 1949	Portugal	13 February 1948
Algeria *	8 November 1962	Hungary *	17 June 1948	Qatar	11 May 1972
Argentina *	22 October 1948	Iceland	17 June 1948	Republic of Korea ..	17 August 1949
Australia *	2 February 1948	India *	12 January 1948	Romania *	8 June 1948
Austria *	30 June 1947	Indonesia	23 May 1950	Rwanda *	7 November 1962
Bahrain	2 November 1971	Iran	23 November 1946	Saudi Arabia	26 May 1947
Bangladesh	19 May 1972	Iraq *	23 September 1947	Senegal *	31 October 1960
Barbados *	25 April 1967	Ireland *	20 October 1947	Sierra Leone *	20 October 1961
Belgium *	25 June 1948	Israel	21 June 1949	Singapore *	25 February 1966
Bolivia	23 December 1949	Italy *	11 April 1947	Somalia	26 January 1961
Brazil *	2 June 1948	Ivory Coast *	28 October 1960	South Africa	7 August 1947
Bulgaria *	9 June 1948	Jamaica *	21 March 1963	Spain	28 May 1951
Burma	1 July 1948	Japan *	16 May 1951	Sri Lanka	7 July 1948
Burundi	22 October 1962	Jordan *	7 April 1947	Sudan	14 May 1956
Byelorussian SSR	7 April 1948	Kenya *	27 January 1964	Sweden *	28 August 1947
Cameroon	6 May 1960	Khmer Republic *	17 May 1950	Switzerland	26 March 1947
Canada *	29 August 1946	Kuwait *	9 May 1960	Syrian Arab Republic ..	18 December 1946
Central African Republic *	20 September 1960	Laos *	17 May 1950	Thailand *	26 September 1947
Chad	1 January 1961	Lebanon	19 January 1949	Togo *	13 May 1960
Chile *	15 October 1948	Lesotho *	7 July 1967	Trinidad and Tobago * ..	3 January 1963
China	22 July 1946	Liberia	14 March 1947	Tunisia *	14 May 1956
Colombia	14 May 1959	Libyan Arab Republic * ..	16 May 1952	Turkey	2 January 1948
Congo	26 October 1960	Luxembourg *	3 June 1949	Uganda	7 March 1963
Costa Rica	17 March 1949	Madagascar *	16 January 1961	Ukrainian SSR	3 April 1948
Cuba *	9 May 1950	Malawi *	9 April 1965	Union of Soviet Socialist Republics * ..	24 March 1948
Cyprus *	16 January 1961	Malaysia *	24 April 1958	United Arab Emirates ...	30 March 1972
Czechoslovakia *	1 March 1948	Maldives *	5 November 1965	United Kingdom of Great Britain and Northern Ireland * ...	22 July 1946
Dahomey	20 September 1960	Mali *	17 October 1960	United Republic of Tanzania *	15 March 1962
Democratic Yemen	6 May 1968	Malta *	1 February 1965	United States of America ..	21 June 1948
Denmark *	19 April 1948	Mauritania	7 March 1961	Upper Volta *	4 October 1960
Dominican Republic	21 June 1948	Mauritius *	9 December 1968	Uruguay	22 April 1949
Ecuador *	1 March 1949	Mexico	7 April 1948	Venezuela	7 July 1948
Egypt *	16 December 1947	Monaco	8 July 1948	Viet-Nam	17 May 1950
El Salvador	22 June 1948	Mongolia *	18 April 1962	Western Samoa	16 May 1962
Ethiopia	11 April 1947	Morocco *	14 May 1956	Yemen	20 November 1953
Fiji	1 January 1972	Nepal *	2 September 1953	Yugoslavia *	19 November 1947
Finland *	7 October 1947	Netherlands *	25 April 1947	Zaire *	24 February 1961
France	16 June 1948	New Zealand *	10 December 1946	Zambia	2 February 1965
Gabon	21 November 1960	Nicaragua *	24 April 1950		
Gambia *	26 April 1971	Niger *	5 October 1960		
Germany, Federal Republic of *	29 May 1951	Nigeria *	25 November 1960		
Ghana *	8 April 1957	Norway *	18 August 1947		
Greece	12 March 1948	Oman	28 May 1971		
Guatemala *	26 August 1949	Pakistan *	23 June 1948		
Guinea *	19 May 1959	Panama	20 February 1951		
Guyana	27 September 1966	Paraguay	4 January 1949		
		Peru	11 November 1949		
		Philippines *	9 July 1948		
				<i>Associate Members</i>	
				Papua New Guinea	26 July 1972
				Southern Rhodesia ¹	16 May 1950

* Member States that have acceded to the Convention on the Privileges and Immunities of the Specialized Agencies and its Annex VII.

¹ Southern Rhodesia's associate membership is regarded as in suspense.

Annex 2

MEMBERSHIP OF THE EXECUTIVE BOARD

1. Forty-ninth Session (Geneva, 18-27 January 1972)

	<i>Designated by</i>		<i>Designated by</i>
Dr H. ABDUL-GHAFFAR ¹	Saudi Arabia	Dr C. HEMACHUDHA	Thailand
Dr Esther AMMUNDSEN	Denmark	Dr M. U. HENRY ³	Trinidad and Tobago
Dr D. ARNAUDOV	Bulgaria	Dr J. L. MOLAPO	Lesotho
Professor E. J. AUJALEU	France	Dr Z. ONYANGO	Kenya
Dr O. AVILÉS	Nicaragua	Dr F. PARRA GIL	Ecuador
Dr B. BAIDYA	Nepal	Dr N. RAMZI	Syrian Arab Republic
Dr A. BARRAUD, ² <i>Vice-Chairman</i>	Upper Volta	Dr A. SÁENZ SANGUINETTI, <i>Rapporteur</i>	Uruguay
Dr F. A. BAUHOFFER	Austria	Dr O. SOUVANNAVONG	Laos
Dr S. BÉDAYA-NGARO	Central African Republic	Professor R. VANNUGLI	Italy
Dr A. BENADOUDA	Algeria	Dr V. P. VASSILOPOULOS, <i>Vice-Chairman</i>	Cyprus
Dr S. P. EHRLICH, Jr, <i>Chairman</i>	United States of America	Dr. D. D. VENEDIKTOV	Union of Soviet Socialist Republics
Mr Y. WOLDE-GERIMA, <i>Rapporteur</i>	Ethiopia	Professor K. YANAGISAWA	Japan

2. Fiftieth Session (Geneva, 29-30 May 1972)

The Twenty-fifth World Health Assembly in resolution WHA25.12 elected Afghanistan, Colombia, Hungary, Indonesia, New Zealand, Niger, the United Kingdom of Great Britain and Northern Ireland, and Zaire to designate persons to serve on the Board in place of the retiring members—designated by Algeria, Bulgaria, the Central African Republic, Cyprus, Japan, Nepal, the United States of America, and Upper Volta. This resulted in the following composition of the Board at the fiftieth session:

	<i>Designated by</i>	<i>Unexpired term of office at the time of closure of the Twenty-fifth World Health Assembly</i>
Dr H. ABDUL-GHAFFAR	Saudi Arabia	1 year
Dr Esther AMMUNDSEN	Denmark	2 years
Professor E. J. AUJALEU	France	1 year
Dr O. AVILÉS ³	Nicaragua	1 year
Dr T. BANA	Niger	3 years
Professor H. FLAMM	Austria	1 year
Mr Y. WOLDE-GERIMA	Ethiopia	1 year
Sir George GODBER	United Kingdom of Great Britain and Northern Ireland	3 years
Dr C. HEMACHUDHA ³	Thailand	2 years
Dr M. U. HENRY	Trinidad and Tobago	2 years
Dr D. P. KENNEDY	New Zealand	3 years
Professor A. M. KHOSHBEEN	Afghanistan	3 years
Dr R. LEKIE	Zaire	3 years
Dr J. L. MOLAPO, <i>Chairman</i>	Lesotho	2 years
Dr Z. ONYANGO	Kenya	1 year
Dr F. PARRA GIL ³	Ecuador	2 years
Dr N. RAMZI, <i>Vice-Chairman</i>	Syrian Arab Republic	2 years
Dr G. RESTREPO CHAVARRIAGA	Colombia	3 years
Dr A. SÁENZ SANGUINETTI, <i>Vice-Chairman</i>	Uruguay	2 years
Dr O. SOUVANNAVONG, <i>Rapporteur</i>	Laos	1 year
Professor Julie SULIANTI SAROSO, <i>Rapporteur</i>	Indonesia	3 years
Professor J. TIGYI	Hungary	3 years
Professor R. VANNUGLI	Italy	2 years
Dr D. D. VENEDIKTOV	Union of Soviet Socialist Republics	1 year

¹ Dr J. M. Aashy, alternate, attended the session.

² Dr G. Diawara, alternate, attended the session.

³ Unable to attend.

Annex 3

ORGANIZATIONAL AND RELATED MEETINGS IN 1972

Executive Board, forty-ninth session: Standing Committee on Administration and Finance	Geneva, 10-17 January
Executive Board, forty-ninth session	Geneva, 18-27 January
Executive Board, forty-ninth session: Standing Committee on Nongovernmental Organizations	Geneva, 18 and 21 January
Executive Board: Ad Hoc Committee on Headquarters Accommodation	Geneva, 27 January, 8 May and 9-10 November
Executive Board: Ad Hoc Committee to consider the Report of the External Auditor on the Accounts of the Organization for the year 1971	Geneva, 8 May
Twenty-fifth World Health Assembly	Geneva, 9-26 May
Executive Board, fiftieth session	Geneva, 29-30 May
Regional Committee for the Eastern Mediterranean: Subcommittee A	Amman, 11-14 September
Regional Committee for South-East Asia, twenty-fifth session	Colombo, 12-18 September
Regional Committee for Europe, twenty-second session	Copenhagen, 18-22 September
Regional Committee for Africa, twenty-second session	Conakry, 20-27 September
Regional Committee for the Western Pacific, twenty-third session	Agana (Guam), 27 September-5 October
Regional Committee for the Americas, twenty-fourth session/XXI Meeting of the Directing Council of PAHO	Santiago, 10-13 October

Annex 4

EXPERT ADVISORY PANELS AND MEETINGS OF COMMITTEES AND SCIENTIFIC GROUPS IN 1972

1. EXPERT ADVISORY PANELS

The expert advisory panels in existence at 31 December 1972 were on the following subjects:

Air pollution	Health of seafarers	Nutrition
Antibiotics	Health statistics	Occupational health
Bacterial diseases	Human genetics	Organization of medical care
Biological standardization	Human reproduction	Parasitic diseases
Brucellosis	Immunology	Professional and technical education of medical and auxiliary personnel
Cancer	Insecticides	Public health administration
Cardiovascular diseases	International pharmacopoeia and pharmaceutical preparations	Rabies
Chronic degenerative diseases	International surveillance of communicable diseases	Radiation
Dental health	Leprosy	Rehabilitation
Drug dependence	Malaria	Trachoma
Drug evaluation	Maternal and child health	Tuberculosis
Environmental health	Medical research ¹	Venereal infections and treponematoses
Food additives	Mental health	Virus diseases
Food hygiene	Nursing	Zoonoses
Health education		
Health laboratory services		

¹ See resolution WHA12.17.

2. MEETINGS OF COMMITTEES AND SCIENTIFIC GROUPS IN 1972

Expert Committees

Expert Committee on Health Statistics (Statistical Principles in Public Health Field Studies) ¹	Geneva, 21-27 March
Joint FAO/WHO Expert Committee on Food Additives (Evaluation of Certain Food Additives and the Contaminants Mercury, Lead, and Cadmium) ²	Geneva, 4-12 April
Expert Committee on Air Quality Criteria and Guides for Urban Air Pollutants ³	Geneva, 5-11 April
Expert Committee on Schistosomiasis Control	Geneva, 3-8 July
Expert Committee on Epidemiological Aspects of Housing and its Environment	Geneva, 26 September-3 October
Expert Committee on Insecticides (Safe Use of Pesticides in Public Health)	Geneva, 10-16 October
Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues	Rome, 20-28 November
Expert Committee on Drug Dependence	Geneva, 21-27 November
Expert Committee on Rabies	Geneva, 12-19 December

Committee on International Surveillance of Communicable Diseases

Seventeenth meeting	Geneva, 13-18 November
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Advisory Committee on Medical Research

Fourteenth session	Geneva, 26-30 June
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Scientific Groups

Scientific Group on the Application of Epidemiological Methodology to the Health Aspects of Family Planning	Geneva, 7-13 March
Scientific Group on the Evaluation of Environmental Health Programmes	Geneva, 13-22 June
Scientific Group on Agents Stimulating Gonadal Function in the Human	Geneva, 28 August-1 September
Scientific Group on Reproductive Function in the Human Male	Geneva, 11-15 September
Scientific Group on Cell-mediated Immunity and Resistance to Infection	Geneva, 19-23 September
Scientific Group on Viral Hepatitis	Geneva, 25-30 September
Scientific Group on Chemotherapy of Malaria	Geneva, 17-24 October
Scientific Group on Pharmacogenetics	Geneva, 4-8 December
Scientific Group on the Relationship between Morbidity and Population Trends	Geneva, 5-11 December
Scientific Group on Advances in Methods of Fertility Regulation	Geneva, 11-15 December

¹ Report published as *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 510.

² Report published as *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 505.

³ Report published as *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 506.

Annex 5

WHO REFERENCE CENTRES, COLLABORATING INSTITUTIONS AND LABORATORIES

The institutions that served or were designated as international or regional reference centres, and collaborating institutions or laboratories during 1972 are listed below under the following headings (asterisks denote those designated during the year):

Air pollution	Genetics, human	Respiratory virus diseases other than influenza
Antibiotics	Immunology	Rheumatic diseases
Arbovirus diseases	Influenza	Rickettsioses
Biological standardization		
Blood groups	Leishmaniasis	Schistosomiasis
Brucellosis	Leprosy	Serum reference banks
	Leptospirosis	Smallpox
Cancer		Staphylococcal infections
Cardiovascular diseases	Malaria	Statistics (Classification of diseases)
Cell cultures	Meningococcal infections	Strengthening of health services
Chemical reference substances	Mental health	Streptococcal infections
Comparative medicine	Mycoplasmas	
		Trachoma
Education	Nutritional anaemias	Trypanosomiasis
Enteric infections, bacterial		Tuberculosis
Enterovirus diseases	Occupational health	
Epidemiology and communications science, research	Plague	Vector biology and control
		Venereal infections and treponematoses
Filariasis	Rabies	Virus diseases, general
Food additives	Radiation	
Food contaminants	Reproduction, human	Wastes disposal
		Water supply

Air Pollution

REFERENCE CENTRES

International Reference Centre for Clinical and Epidemiological Aspects of Air Pollution

Medical Research Council's Air Pollution Research Unit, St Bartholomew's Hospital Medical College, London, United Kingdom

International Reference Centre on Air Pollution Control

Air Pollution Control Office, National Environmental Research Center, Environmental Protection Agency, Research Triangle Park, N.C., USA

Regional Reference Centres on Air Pollution

Central Public Health Engineering Research Institute, Nagpur, India

Department of Community Environmental Sciences, Institute of Public Health, Tokyo, Japan

Department of Community Hygiene, Central Institute for Advanced Medical Studies, Ministry of Health of the USSR, Moscow, USSR

COLLABORATING INSTITUTIONS AND LABORATORIES

Air Pollution Control Service, Sursan Institute of Sanitary Engineering, Rio de Janeiro, Brazil

Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

Regional Institute for Air Pollution and Land Use Control of North Rhine-Westphalia, Essen, Federal Republic of Germany

Institute of Occupational Health, Helsinki, Finland

Centre de Recherches sur la Pollution atmosphérique, Institut national de la Santé et de la Recherche médicale, Le Vésinet, Yvelines, France

Industrial Hygiene Section, Labour Department, Hong Kong

Division of Air Pollution and Radiation Control, Ministry of Health, Tel Aviv, Israel

Laboratory of Air Pollution, Institute of Analytical Chemistry, University of Rome, Italy

Air Pollution Division, Research Institute for Public Health Engineering, Delft, Netherlands

Research Laboratory of the National Environmental Protection Board, Solna, Stockholm, Sweden

Institute of Medical Research and Industrial Hygiene, Zagreb, Yugoslavia

Antibiotics

REFERENCE CENTRE

International Centre for Information on Antibiotics

Laboratoire de Bactériologie et de Parasitologie, University of Liège, Belgium

Arbovirus Diseases

REFERENCE CENTRES

International Reference Centre for Arboviruses

Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, Conn., USA

Regional Reference Centres for Arboviruses

Department of Virology, Queensland Institute of Medical Research, Brisbane, Australia
 Institute of Virology, Bratislava, Czechoslovakia
 Laboratoire des Arbovirus, Institut Pasteur, Paris, France
 Virus Research Centre, Indian Council of Medical Research, Poona, India
 Department of Virology and Rickettsiology, National Institute of Health, Tokyo, Japan
 Institut Pasteur, Dakar, Senegal
 East African Virus Research Institute, East African Common Services Organization, Entebbe, Uganda
 Department for Arboviruses, Institute of Poliomyelitis and Viral Encephalitis, Moscow, USSR
 Virology Section, Center for Disease Control, Atlanta, Ga., USA

COLLABORATING LABORATORIES

Arbovirus Laboratory, Adolfo Lutz Institute, São Paulo, Brazil
 Department of Arboviruses, Ivanovskij Institute of Virology, Moscow, USSR

Biological Standardization

REFERENCE CENTRES

International Laboratories for Biological Standards

Statens Seruminstitut, Copenhagen, Denmark
 National Institute for Biological Standards and Control, London, United Kingdom
 Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Food, Weybridge, United Kingdom

COLLABORATING LABORATORIES

Collaborating Laboratories for Research and Reference Services for Certain Immunological Biological Products

Biologics Control Laboratories, Laboratory Center for Disease Control, Department of National Health and Welfare, Ottawa, Ont., Canada
 State Institute for Drug Control, Ministry of Health, Prague, Czechoslovakia
 Statens Seruminstitut, Copenhagen, Denmark
 Second Department of Bacteriology, National Institute of Health, Tokyo, Japan
 Laboratory of Biological Standards, National Institute of Public Health, Utrecht, Netherlands
 * Division of Immunological Products Control, National Institute for Biological Standards and Control,¹ London, United Kingdom
 Institute of Immunology, Zagreb, Yugoslavia

Blood Groups*International Blood Group Reference Laboratory*

Medical Research Council's Blood Group Reference Laboratory, London, United Kingdom

Brucellosis

REFERENCE CENTRES

FAO/WHO Brucellosis Centres

Commonwealth Serum Laboratories, Parkville, Victoria, Australia

State Veterinary Serum Laboratory, Copenhagen, Denmark
 Institut de Biologie, Montpellier, France
 Veterinary Microbiological Institute, Athens, Greece
 Indian Veterinary Research Institute, Mukteswar-Kumaon, Uttar Pradesh, India
 Institute of Hygiene, Faculty of Medicine, University of Florence, Italy
 National Institute of Animal Health, Tokyo, Japan
 Medical Research Institute, General Hospital, Mexico City, Mexico
 Institut Pasteur, Tunis, Tunisia
 Institute of Veterinary Bacteriology and Serology, Istanbul, Turkey
 Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Food, Weybridge, United Kingdom
 Department of Medicine, University of Minnesota Medical School, Minneapolis, Minn., USA

WHO Brucellosis Centre

Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Cancer

REFERENCE CENTRES

International Reference Centre for Comparative Oncology

Armed Forces Institute of Pathology, Washington, D.C., USA

International Reference Centre for Evaluation of Methods of Diagnosis and Treatment of Breast Cancer

Institut Gustave Roussy, Villejuif, Val-de-Marne, France

International Reference Centre for Evaluation of Methods of Diagnosis and Treatment of Female Genital Tract (Ovarian) Cancer

N. N. Petrov Research Institute of Oncology, Leningrad, USSR

International Reference Centre for Evaluation of Methods of Diagnosis and Treatment of Melanoma

National Institute for the Study and Treatment of Tumours, Milan, Italy

International Reference Centre for Evaluation of Methods of Diagnosis and Treatment of Stomach Cancer

National Cancer Centre Hospital, Tokyo, Japan

International Reference Centre for the Histological Classification of Bone Tumours

Latin American Registry of Bone Pathology, Osteo-articular Pathology Centre, Italian Hospital, Buenos Aires, Argentina

International Reference Centre for the Histological Classification of Tumours of the Central Nervous System and Allied Structures

Department of General Neurology, Max-Planck Institute for Brain Research, Cologne, Federal Republic of Germany

International Reference Centre for the Histological Classification of Endocrine Tumours

* Department of Pathology, Welsh National School of Medicine, Cardiff, United Kingdom

International Reference Centre for the Histological Classification of Eye and Orbit Tumours

* Armed Forces Institute of Pathology, Washington, D.C., USA

International Reference Centre for the Histological Classification of Gastro-oesophageal Tumours

Department of Pathology, University of Tokyo Faculty of Medicine, Tokyo, Japan

International Reference Centre for the Histological Classification of Intestinal Tumours

Research Department, St Mark's Hospital, London, United Kingdom

International Reference Centre for the Histological Classification of Leukaemias and other Neoplastic Conditions of the Haematopoietic Cells

Institut de Cancérologie et d'Immunogénétique, Hôpital Paul-Brousse, Villejuif, Val-de-Marne, France

International Reference Centre for the Histological Classification of Tumours of the Liver, Biliary Tract and Pancreas

* Department of Pathology, Queen Mary Hospital, University of Hong Kong, Hong Kong

International Reference Centre for the Histological Classification of Lung Tumours

Institute of General and Experimental Pathology, University of Oslo, Norway

International Reference Centre for the Histological Classification of Male Urogenital Tract Tumours

Armed Forces Institute of Pathology, Washington, D.C., USA

International Reference Centre for the Histological Classification of Mammary Tumours

Bland Sutton Institute of Pathology, Middlesex Hospital, London, United Kingdom

International Reference Centre for the Histological Classification of Odontogenic Tumours

Department of Oral Pathology, Royal Dental College, Copenhagen, Denmark

International Reference Centre for the Histological Classification of Oral Precancerous Conditions

Department of Oral Pathology, Royal Dental College, Copenhagen, Denmark

International Reference Centre for the Histological Classification of Oropharyngeal Tumours

Sarojini Najdu Medical College, Agra, Uttar Pradesh, India

International Reference Centre for the Histological Classification of Ovarian Tumours

N. N. Petrov Research Institute of Oncology, Leningrad, USSR

International Reference Centre for the Histological Classification of Salivary Gland Tumours

Bland Sutton Institute of Pathology, Middlesex Hospital, London, United Kingdom

International Reference Centre for the Histological Classification of Skin Tumours

Pathology Department, University of Western Australia, Perth, Australia

International Reference Centre for the Histological Classification of Soft Tissue Tumours

Armed Forces Institute of Pathology, Washington, D.C., USA

International Reference Centre for the Histological Classification of Thyroid Tumours

University Institute of Pathology, Cantonal Hospital, Zurich, Switzerland

International Reference Centre for the Histological Classification of Upper Respiratory Tract Tumours

* Department of Pathology, Faculty of Medicine, University of Singapore, Singapore

International Reference Centre for the Histological Classification of Uterine and Placental Tumours

Institute of Pathology, Municipal Hospital, Copenhagen, Denmark

International Reference Centre for Nomenclature in Cytology

Centre de Cytologie et de Dépistage du Cancer, Geneva, Switzerland

WHO/IARC International Reference Centre for the Provision of Frozen Transplantable Tumour Strains

Research Unit of Tumour Immunology, Karolinska Institute, Stockholm, Sweden

WHO/IARC International Reference Centre for the Provision and Study of Tumour-bearing Animals

Netherlands Cancer Institute, Amsterdam, Netherlands

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Laboratories for Comparative Medicine: Cancer Tumours of the Alimentary Canal

Department of Veterinary Pathology, Royal (Dick) School of Veterinary Studies, University of Edinburgh, United Kingdom

Bone Tumours

Pathology Department, Netherlands Cancer Institute, Amsterdam, Netherlands

Tumours of the Eye

Armed Forces Institute of Pathology, Washington, D.C., USA

Tumours of the Haematopoietic System

Veterinary School, University of Glasgow, United Kingdom

Coordination of Studies on Leukaemia

Royal Veterinary and Agricultural College, Copenhagen, Denmark

Tumours of the Liver

* Department of Pathology, Institute of Experimental and Clinical Oncology, Academy of Medical Sciences of the USSR, Moscow, USSR

Tumours of the Mammary Gland

Pathological Department, University of Amsterdam, Netherlands

Tumours of the Respiratory Tract

Institute of Veterinary Pathology, University of Zurich, Switzerland

Skin Tumours

Institute of Veterinary Pathology, University of Giessen, Federal Republic of Germany

Tumours of the Thyroid Gland

Institute of General Pathology and Pathological Anatomy, Faculty of Veterinary Medicine, University of Munich, Federal Republic of Germany

Tumours of the Urinary Bladder

Department of Pathological Anatomy, Faculty of Veterinary Medicine, Ankara University, Turkey

Tumours of the Urogenital System

Department of Animal Diseases, College of Agriculture and Natural Resources, University of Connecticut, Storrs, Conn., USA

Cardiovascular Diseases

REFERENCE CENTRES

International Reference Centre for Lipid Determination in Cardiovascular Research

Lipid Standardization Laboratory, Medical Laboratory Section, Center for Disease Control, Atlanta, Ga., USA

Regional Reference Centre for Blood Lipid Research in Atherosclerosis and Ischaemic Heart Disease

* Lipid Laboratory, Division of Cardiovascular Research, Institute of Clinical and Experimental Medicine, Prague, Czechoslovakia

Research and Training Centres for Cardiovascular Diseases

Makerere University Faculty of Medicine, Kampala, Uganda

* Laboratory of Cardiovascular Epidemiology, Mjasnikov Institute of Cardiology, Moscow, USSR

COLLABORATING LABORATORIES

Collaborating Laboratories for Research in the Etiology, Treatment and Prevention of Cardiovascular Diseases

Clinic of Tropical and Infectious Diseases, Faculty of Medicine, Federal University of Bahia, Brazil

Department of Pathology, Ribeirão Preto Faculty of Medicine, University of São Paulo, Brazil

Second Department of Pathology, School of Medicine, Charles University, Prague, Czechoslovakia

Division of Cardiovascular Research, Institute of Clinical and Experimental Medicine, Prague, Czechoslovakia

Department of Medical Ecology, Hadassah Medical School, Jerusalem, Israel

Medical Research Council's Epidemiological Research Unit (Jamaica), University of the West Indies, Kingston, Jamaica

Department of Pathology, Faculty of Medicine, University of the West Indies, Kingston, Jamaica

Epidemiology Unit, Wellington Hospital, Wellington, New Zealand

* Laboratory of Environmental Physiology, Norwegian Research Council for Humanities and Sciences, Oslo, Norway

Cardiovascular Laboratory, High Altitude Research Institute, Peruvian University of Medical and Biological Sciences, Lima, Peru

Department of Pathology, General Hospital, Malmö, Sweden

Centre de Cardiologie, Hôpital cantonal, Geneva, Switzerland

Department of Cardiology, Royal Infirmary, University of Edinburgh, United Kingdom

Medical Research Council's Social Medicine Research Unit, London School of Hygiene and Tropical Medicine, London, United Kingdom

Department of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, Mich., USA

Laboratory of Physiological Hygiene, School of Public Health, University of Minnesota, Minneapolis, Minn., USA

Laboratory for Lipid Metabolism, Institute of Experimental Medicine, Leningrad, USSR

Cardiovascular Diseases Division, Ministry of Health and Social Welfare, Caracas, Venezuela

Collaborating Laboratory for Comparative Medicine: Cardiovascular Studies

Comparative Cardiovascular Studies Unit, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., USA

Cell Cultures

REFERENCE CENTRE

International Reference Centre for Cell Cultures

American Type Culture Collection, Rockville, Md., USA

Chemical Reference Substances

REFERENCE CENTRE

Centre for Chemical Reference Substances

Centre for Authentic Chemical Substances, Apotekens Central-laboratorium Apoteksbolaget AB, Solna, Stockholm, Sweden

Comparative Medicine¹

REFERENCE CENTRE

Regional Reference Centre for Simian Viruses

* Division of Microbiology and Infectious Diseases, Southwest Foundation for Research and Education, San Antonio, Tex., USA

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Laboratories for Comparative Medicine

Studies in Epidemiology of Chronic Diseases

Royal Veterinary College, London, United Kingdom

Nervous Diseases

Institute of Comparative Neurology, Faculty of Veterinary Medicine, University of Berne, Switzerland

¹ See also under Cancer and Cardiovascular Diseases.

Pathology of Undomesticated Vertebrates

Nuffield Institute of Comparative Medicine, Zoological Society of London, London, United Kingdom

Feline Viruses

Department of Microbiology, New York State Veterinary College, Cornell University, Ithaca, N.Y., USA

Education**COLLABORATING INSTITUTIONS****Collaborating Institutions for Postgraduate Education**

Central Institute for Advanced Medical Studies, Ministry of Health of the USSR, Moscow, USSR

Center for Educational Development, University of Illinois College of Medicine, Chicago, Ill., USA

Enteric Infections, Bacterial**REFERENCE CENTRES****International Reference Centre for Enteric Phage-Typing**

Central Public Health Laboratory, London, United Kingdom

International Reference Centre for Escherichia

Statens Seruminstitut, Copenhagen, Denmark

International Reference Centre for Salmonella

Institut Pasteur, Paris, France

International Reference Centres for Shigella

Central Public Health Laboratory, London, United Kingdom

Center for Disease Control, Atlanta, Ga., USA

International Reference Centre for Vibrios

Cholera Research Centre, Calcutta, India

Enterovirus Diseases**REFERENCE CENTRES****International Reference Centre for Enteroviruses**

Department of Virology and Epidemiology, Baylor University College of Medicine, Houston, Tex., USA

Regional Reference Centres for Enteroviruses

Enteroviruses Department, Statens Seruminstitut, Copenhagen, Denmark

Section de Virologie, Laboratoire national de la Santé publique, Lyons, France

Department of Enteroviruses, National Institute of Health, Tokyo, Japan

Department of Bacteriology, University of Singapore, Singapore
Enterovirology Unit, Virology Section, Center for Disease Control, Atlanta, Ga., USA

Institute of Poliomyelitis and Viral Encephalitis, Moscow, USSR

Epidemiology and Communications Science, Research**Epidemiological Research Centre**

Institute of Public Health Research, School of Public Health, University of Teheran, Iran

Filariasis**REFERENCE CENTRE****International Reference Centre for Filarioidea**

Department of Medical Helminthology, London School of Hygiene and Tropical Medicine, London, United Kingdom

Food Additives**COLLABORATING LABORATORIES****Collaborating Laboratory on Toxicology**

* Institute of Experimental Pathology and Toxicology, Albany Medical College, Union University, Albany, N.Y., USA

Joint FAO/WHO Collaborating Laboratories on Food Colours

Max von Pettenkofer Institute, Berlin

Food Advisory Bureau, Food and Drug Directorate, Department of National Health and Welfare, Ottawa, Ont., Canada

Laboratory of Chemical Food Analysis, National Institute of Public Health, Utrecht, Netherlands

Division of Colors and Cosmetics Technology, Food and Drug Administration, Department of Health, Education, and Welfare, Washington, D.C., USA

Food Contaminants**REFERENCE CENTRE****FAO/WHO International Reference Centre for Documentation on Marine Biotoxins**

World Life Research Institute, Colton, Calif., USA

Genetics, Human**REFERENCE CENTRES****International Reference Centre for Abnormal Haemoglobins**

Medical Research Council's Abnormal Haemoglobin Research Unit, University of Cambridge, United Kingdom

International Reference Centre for Glucose-6-Phosphate Dehydrogenase

Department of Medicine, University of Washington, Seattle, Wash., USA

Regional Reference Centres for Glucose-6-Phosphate Dehydrogenase

Department of Haematology, Chaim Sheba Medical Centre, Tel Hashomer, Israel

Sub-Department of Haematology, University College Hospital, Ibadan, Nigeria

International Reference Centre for the Processing of Human Genetics Data

Population Genetics Laboratory, School of Medicine, University of Hawaii, Honolulu, Hawaii, USA

International Reference Centre for Serum Protein Groups

Zoology Department, University of Texas, Austin, Tex., USA

Immunology

REFERENCES CENTRES

International Reference Centre for Genetic Factors of Human Immunoglobulins

Centre départemental de Transfusion sanguine et de Génétique humaine, Bois-Guillaume, Seine-Maritime, France

Regional Reference Centres for Genetic Factors of Human Immunoglobulins

Department of Medical Microbiology, University of Lund, Sweden

Department of Biology, Western Reserve University, Cleveland, Ohio, USA

International Reference Centre for Immunoglobulins

Institut de Biochimie, University of Lausanne, Switzerland

Regional Reference Centre for Immunoglobulins

National Cancer Institute, National Institutes of Health, Bethesda, Md., USA

International Reference Centre for the Use of Immunoglobulin Anti-D in the Prevention of Rh Sensitization

Medical Research Council's Experimental Haematology Research Unit, St Mary's Hospital Medical School, London, United Kingdom

International Reference Centre for the Serology of Autoimmune Disorders

Department of Immunology, Middlesex Hospital Medical School, London, United Kingdom

Regional Reference Centres for the Serology of Autoimmune Disorders

The Walter and Eliza Hall Institute of Medical Research, Melbourne University, Victoria, Australia

Center for Immunology, School of Medicine, State University of New York at Buffalo, N.Y., USA

International Reference Centre for Testing of Natural Resistance Factors

Department of Immunology, Institute of Microbiology, Prague, Czechoslovakia

International Reference Centre for Tumour-Specific Antigens

Division of Immunology and Oncology, Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Research and Training Centres for Immunology

Instituto Butantan, São Paulo, Brazil

* Faculty of Medicine, University of Nairobi, Kenya

School of Medicine, American University of Beirut, Lebanon

Children's Hospital of Mexico, Mexico City, Mexico

Department of Chemical Pathology, University College Hospital, Ibadan, Nigeria

Faculty of Medicine, University of Singapore, Singapore

Institut de Biochimie, University of Lausanne, Switzerland

Research and Training Centres for Advanced Studies in Immunology

Department of Chemical Immunology and Cell Biology, Weizmann Institute of Science, Rehovot, Israel

* Basle Institute of Immunology, Basle, Switzerland

COLLABORATING LABORATORY

Collaborating Laboratory for Research Training in General Immunology

Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Influenza

REFERENCES CENTRES

World Influenza Centre

National Institute for Medical Research, London, United Kingdom

International Influenza Centre for the Americas

Virology Section, Center for Disease Control, Atlanta, Ga., USA

Leishmaniasis

REFERENCE CENTRE

International Reference Centre for Leishmaniasis

Department of Parasitology, Hadassah Medical School, Jerusalem, Israel

Leprosy

REFERENCE CENTRES

International Reference Centre for the Serology of Leprosy

Department of Microbiology and Immunology, Ribeirão Preto Faculty of Medicine, University of São Paulo, Brazil

International Reference Centre for the Histological Identification and Classification of Leprosy

Division of Dermatology, Ministry of Health and Social Welfare, Caracas, Venezuela

Regional Reference Centres for Mycobacterium leprae

Virology Section, Center for Disease Control, Atlanta, Ga., USA

Division of Bacteriology and Virus Research, National Institute for Medical Research, London, United Kingdom

Regional Reference Centres for the Standardization of Lepromin

Laboratory of Serology, National Institute for Leprosy Research, Tokyo, Japan

Leonard Wood Memorial Laboratory for Leprosy Research, Johns Hopkins University, Baltimore, Md., USA

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Institution for Epidemiology of Leprosy

* Département d'Epidémiologie, Ecole de Santé publique, Université Catholique de Louvain, Brussels, Belgium

Collaborating Laboratory for Immunology of Leprosy

Municipal Bacteriology Laboratory, Aurora Hospital, Helsinki, Finland

Collaborating Institutions and Laboratories for the Cultivation and Study of Mycobacterium leprae

Laboratoire de Bactériologie et de Virologie, Institut de Médecine tropicale Prince Léopold, Antwerp, Belgium

Service de Bactériologie et de Virologie alimentaires, Ecole de Santé publique, Université Catholique de Louvain, Brussels, Belgium

Institute of Microbiology and Hygiene, University of Montreal, Canada

Armauer Hansen Research Institute, Addis Ababa, Ethiopia

* Ernst Rodenwaldt Institute of Experimental Medicine and Hygiene, Koblenz, Federal Republic of Germany

* Laboratory Research Branch, US Public Health Service Hospital, Carville, La., USA

Collaborating Laboratory for Transmission of Mycobacterium leprae

* Department of Biochemistry, Atchafalaya Basin Laboratories, Gulf South Research Institute, New Iberia, La., USA

Leptospirosis

REFERENCE CENTRES

WHO/FAO Leptospirosis Reference Laboratories

Laboratory of Microbiology and Pathology, State Health Department, Brisbane, Australia

Israel Institute for Biological Research, Tel Aviv University Medical School, Ness-Ziona, Israel

Istituto Superiore di Sanità, Rome, Italy

National Institute of Health, Tokyo, Japan

Institute for Tropical Hygiene (Royal Tropical Institute), Amsterdam, Netherlands

London School of Hygiene and Tropical Medicine, London, United Kingdom

Division of Veterinary Medicine, Walter Reed Army Medical Center, Washington, D.C., USA

WHO Leptospirosis Reference Laboratory

Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Malaria

REFERENCE CENTRES

International Reference Centre for Malaria

Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md., USA

Regional Reference Centres for Malaria

National Institute of Communicable Diseases, New Delhi, India

Horton Malaria Reference Laboratory, Epsom, United Kingdom

International Reference Centre for Avian Malaria Parasites

Department of Biology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada

Regional Reference Centre for Screening of Potential Antimalarial Compounds

Department of Parasitology, Liverpool School of Tropical Medicine, Liverpool, United Kingdom

COLLABORATING LABORATORY

Collaborating Laboratory for the Development of Malaria Serological Techniques

Nuffield Institute of Comparative Medicine, Zoological Society of London, London, United Kingdom

Meningococcal Infections

REFERENCE CENTRE

International Reference Centre for Meningococci

Laboratoire de Microbiologie, Centre de Recherches du Service de Santé des Troupes de Marine, Marseilles, France

Mental Health

REFERENCE CENTRES

International Reference Centre for Information on Psychotropic Drugs

National Institute of Mental Health, Rockville, Md., USA

International Reference Centre for the Study of Adverse and Side Effects of Psychotropic Drugs

Centre psychiatrique Sainte-Anne, Paris, France

Regional Reference Centres for the Study of Psychotropic Drugs

Faculty of Medicine, Hokkaido University, Sapporo, Japan

Clinique neuro-psychiatrique, Faculté mixte de Médecine et de Pharmacie, University of Dakar, Senegal

Psychiatric Clinic, Faculty of Medicine, University of Basle, Switzerland

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Centres for the Study of Psychotropic Drugs

Clinic of Psychiatry and Neurology, Faculty of Medicine, University of Vienna, Austria

Clinique psychiatrique, Faculté de Médecine, University of Liège, Belgium

Division of Psychopharmacology, Department of Psychiatry, McGill University, Montreal, Canada

* Behman Hospital, Helwan, Egypt

Department of Psychiatry, University of Ghana Medical School, Accra, Ghana

* Psychiatric Department, Seth G. S. Medical College, Bombay, India

Institute of Clinical Psychiatry, University of Milan, Italy

Department of Neurobiology, Institute of Biomedical Investigations, National Autonomous University of Mexico, Mexico City, Mexico

Department of Psychiatry and Neurology, University of Ibadan Faculty of Medicine, Nigeria

* Department of Psychiatry, Aasgaard Hospital, Tromsø, Norway

Department of Neurology and Psychiatry, School of Medicine, University of Zagreb, Yugoslavia

Mycoplasmas

REFERENCES CENTRES

International Reference Centre for Human Mycoplasmas

Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md., USA

FAO/WHO International Reference Centre for Animal Mycoplasmas

Institute of Medical Microbiology, University of Aarhus Medical Faculty, Denmark

COLLABORATING LABORATORY

Collaborating Laboratory for Mycoplasmas

Laboratory for Mycoplasmas, Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Nutritional Anaemias

REFERENCES CENTRES

International Reference Centre for Anaemias

School of Medicine, University of Washington, Seattle, Wash., USA

Regional Reference Centres for Anaemias

Department of Pathology, St Bartholomew's Hospital Medical College, London, United Kingdom

Venezuelan Institute for Scientific Research, Caracas, Venezuela

Occupational Health

COLLABORATING INSTITUTIONS

Collaborating Institutions in Occupational Health

- * Institute of Occupational Health, Helsinki, Finland
- * Department of Public Health, Faculty of Medicine, Kurume University, Japan
- * Institute of Industrial Medicine, Catholic Industrial Medical Centre, Seoul, Republic of Korea
- * Occupational Health Division, Ministry of Health, Khartoum, Sudan
- * TUC Centenary Institute of Occupational Health, London School of Hygiene and Tropical Medicine, London, United Kingdom

Collaborating Institution on the Health of Seafarers

- * Health Centre for Seafarers, Gdynia, Poland

Plague

REFERENCE CENTRE

International Reference Centre for Plague

Central Asian Institute for Research on Plague Control, Alma-Ata, USSR

Rabies

REFERENCE CENTRES

International Reference Centres for Rabies

Institut Pasteur, Paris, France

Pasteur Institute of Southern India, Coonoor, India

Institute of Poliomyelitis and Viral Encephalitis, Moscow, USSR

Wistar Institute of Anatomy and Biology, Philadelphia, Pa., USA

Regional Reference Centre for Rabies in the Americas

Rabies Laboratory, Center for Disease Control, Atlanta, Ga., USA

Radiation

REFERENCE CENTRES

International Reference Centre on Environmental Radiation

Service central de Protection contre les Rayonnements ionisants, Le Vésinet, Yvelines, France

Regional Reference Centres for Secondary Standards in Radiation Dosimetry (in collaboration with IAEA)

Laboratory for Dosimetry, National Atomic Energy Commission, Buenos Aires, Argentina

* Radiotherapy Department, Faculty of Medicine, Pahlavi Hospital, University of Teheran, Iran

Department of Radiotherapy, Institute of Oncology, National Medical Centre of the Mexican Social Security Institute, General Hospital, Mexico City, Mexico

Radiation Hygiene Laboratory, Institute of Hygiene, Bucharest, Romania

Radiotherapy Department, Outram Road General Hospital, Singapore

International Reference Centre for Chromosome Aberrations: Comparison and Standardization of Methods

- * Human Cytogenetics Division, Environmental Health Centre, Department of National Health and Welfare, Ottawa, Ont., Canada

International Reference Centre for Chromosome Aberrations: Evaluation in Population

- * Clinical Population Cytogenetics Research Unit, Medical Research Council, Edinburgh, United Kingdom

International Reference Centre for Effect of Environmental Factors on Chromosome Aberrations

- * Institute of Medical Genetics, Academy of Medical Sciences of the USSR, Moscow, USSR

International Reference Centre for General Nuclear Medicine (in collaboration with IAEA)

- * Institute of Nuclear Medicine, German Centre for Cancer Research, Heidelberg, Federal Republic of Germany

Regional Reference Centre for Nuclear Medicine (in collaboration with IAEA)

- * Radiation Medicine Centre, Atomic Energy Establishment, Trombay, Bombay, India

Reproduction, Human

REFERENCE CENTRES

International Reference Centre for the Biology of Spermatozoa
Laboratory of Reproductive Pharmacology, New York Medical College, New York, N.Y., USA

International Reference Centre for Fertility Promoting Agents
Institute of Endocrinology, Chaim Sheba Medical Centre, Tel Hashomer, Israel

International Reference Centre for Epidemiological Studies in Human Reproduction

* Population Epidemiology Unit and Carolina Population Center, University of North Carolina, Chapel Hill, N.C., USA

Research and Training Centres in Human Reproduction

* Latin American Institute of the Physiology of Reproduction, Faculty of Medicine, University of Salvador, Buenos Aires, Argentina

* Department of Human Reproduction, All-India Institute of Medical Sciences, Indian Council of Medical Research, New Delhi, India

Reproductive Endocrinology Research Unit, Karolinska Institute, Stockholm, Sweden

* All-Union Scientific Research Institute of Obstetrics and Gynaecology, Ministry of Health of the USSR, Moscow, USSR

Clinical Research Centres in Human Reproduction

* Department of Obstetrics and Gynaecology, Queen Elizabeth II Research Institute for Mothers and Infants, University of Sydney, Australia

* Clinique de Gynécologie et d'Obstétrique et Laboratoire de Gynécologie expérimentale, Hôpital universitaire Saint-Pierre, Free University of Brussels, Belgium

* Department of Gynaecological Endocrinology, Faculty of Medicine, Free University of Berlin

* Obstetrics Clinic, Climerio de Oliveira Maternity Hospital, Faculty of Medicine, Federal University of Bahia, Brazil

* Gynaecology and Obstetrics Unit, Barros Luco-Trudeau Hospital, Santiago, Chile

* Department of Obstetrics and Gynaecology, Medical School, University of Szeged, Hungary

* Department of Obstetrics and Gynaecology, Postgraduate Institute of Medical Education and Research, Chandigarh, Punjab, India

* Research Division, Department of Reproductive Biology, National Institute of Nutrition, Mexico City, Mexico

* Department of Obstetrics and Gynaecology, Academic Hospital, University of Utrecht, Netherlands

* Department of Obstetrics and Gynaecology, Faculty of Medicine, University of Ibadan, Nigeria

* Department of Obstetrics and Gynaecology, Kandang Kerbau Hospital for Women, University of Singapore, Singapore

* Family Planning Research Unit, Department of Obstetrics and Gynaecology, Siriraj Hospital, Mahidol University, Bangkok, Thailand

* Department of Obstetrics and Gynaecology, Women's Hospital, University of Southern California Medical Center, Los Angeles, Calif., USA

* Family Planning Institute, University Clinical Hospital, University of Ljubljana, Yugoslavia

COLLABORATING INSTITUTION

Collaborating Institution for Epidemiological Studies in Human Reproduction

* Gandhigram Institute of Rural Health and Family Planning, Gandhigram, Madurai District, Tamil Nadu, India

Respiratory Virus Diseases other than Influenza

REFERENCE CENTRES

International Reference Centres for Respiratory Viruses other than Influenza

Common Cold Research Unit, National Institute for Medical Research, Harvard Hospital, Salisbury, Wilts., United Kingdom

Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md., USA

Regional Reference Centres for Respiratory Viruses other than Influenza

Fairfield Hospital Communicable Disease Centre, Melbourne, Victoria, Australia

Department of Epidemiology and Microbiology, Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

Respiratory Virus Laboratory, National Institute of Health, Tokyo, Japan

Ivanovskij Institute of Virology, Moscow, USSR

Virology Section, Center for Disease Control, Atlanta, Ga., USA

Rheumatic Diseases

REFERENCE CENTRES

International Reference Centre for the Study of Connective Tissue Diseases

Hôpital Cochin, Paris, France

Regional Reference Centres for the Study of Connective Tissue Diseases

Rheumatology Service, Medical Clinic, Faculty of Medicine, University of Barcelona, Spain

Institute of Rheumatology, Academy of Medical Sciences of the USSR, Moscow, USSR

Connective Tissue Division, Johns Hopkins University School of Medicine, Baltimore, Md., USA

Medical Clinic, Faculty of Medicine, University of the Republic, Montevideo, Uruguay

Rickettsioses

REFERENCE CENTRES

Regional Reference Centres for Human Rickettsioses

Institute of Virology, Bratislava, Czechoslovakia

Rocky Mountain Laboratory, National Institute of Allergy and Infectious Diseases, Hamilton, Mont., USA

Schistosomiasis

REFERENCE CENTRE

Snail Identification Centre

Danish Bilharziasis Laboratory, Copenhagen, Denmark

Serum Reference Banks

Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

National Institute of Health, Tokyo, Japan

Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, Conn., USA

Smallpox

REFERENCES CENTRES

International Reference Centre for Smallpox

Laboratory of Smallpox Prophylaxis, Research Institute of Virus Preparations, Moscow, USSR

Regional Reference Centre for Smallpox

Center for Disease Control, Atlanta, Ga., USA

International Reference Centre for Smallpox Vaccine

Virus and Rickettsial Diseases Laboratory, National Institute of Public Health, Utrecht, Netherlands

Regional Reference Centre for Smallpox Vaccine

Connaught Medical Research Laboratories, University of Toronto, Ont., Canada

COLLABORATING LABORATORIES

Collaborating Laboratory for Laboratory Diagnostic Methods for Smallpox

Section des Virus, Laboratoire national de la Santé publique, Paris, France

Collaborating Laboratory for Poxvirus (Variola-Vaccinia-Monkeypox) Studies in Monkeys

Department of Enteroviruses, National Institute of Health, Tokyo, Japan

Collaborating Laboratory for Strain Specificity of Poxvirus

Department of Microbiology, University of Reading, United Kingdom

Collaborating Laboratory for Variations of Variola and Vaccinia Virus Strains

Department of Virology, Wright-Fleming Institute of Microbiology, St Mary's Hospital Medical School, University of London, United Kingdom

Staphylococcal Infections

REFERENCE CENTRE

International Reference Centre for Staphylococcal Phage-Typing
Central Public Health Laboratory, London, United Kingdom

Statistics (Classification of Diseases)

REFERENCE CENTRES

International Reference Centres for the Classification of Diseases

Section Information sur la Santé publique, Institut national de la Santé et de la Recherche médicale, Boulogne-sur-Seine, France

Department of Public Health Statistics, Semaško Institute of Social Hygiene and Public Health Administration, Moscow, USSR

Office of Population Censuses and Surveys, Somerset House, London, United Kingdom

Latin American Centre for Classification of Diseases, Centro Simón Bolívar, Caracas, Venezuela

Strengthening of Health Services

COLLABORATING INSTITUTION

Collaborating Institution for Integrated Health Service Training and Development

* Regional University Centre for Health Sciences, Negev University, Beer Sheba, Israel

Streptococcal Infections

REFERENCE CENTRE

International Reference Centre for Streptococcus Typing

Streptococcus Reference Laboratory, Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

Trachoma

REFERENCE CENTRE

International Reference Centre for Trachoma and other Chlamydial Infections

Francis I. Proctor Foundation for Research in Ophthalmology, University of California Medical Center, San Francisco, Calif., USA

COLLABORATING LABORATORY

Ornithosis Department, Statens Seruminstitut, Copenhagen, Denmark

Trypanosomiasis

REFERENCE CENTRE

International Reference Centre for Trypanosomiasis

East African Trypanosomiasis Research Organization, Tororo, Uganda

Tuberculosis

REFERENCE CENTRES

International Reference Centre for the Diagnosis of Tuberculosis
Tuberculosis Research Institute, Prague, Czechoslovakia

Regional Reference Centre for the Diagnosis of Tuberculosis

Department of Tuberculosis, National Institute of Health, Tokyo, Japan

International Reference Centre for BCG Seed-lots and Control of BCG Products

BCG Department, Statens Seruminstitut, Copenhagen, Denmark

Regional Reference Centre for Bacteriology of Tuberculosis

National Tuberculosis Institute, El Algodonal, Caracas, Venezuela

COLLABORATING INSTITUTION

Collaborating Center for Tuberculosis Chemotherapy

Second Tuberculosis Clinic, Medical Faculty, Charles University, Prague, Czechoslovakia

Vector Biology and Control

REFERENCE CENTRES

International Reference Centre for the Diagnosis of Diseases of Vectors

Department of Zoology and Entomology, Ohio State University, Columbus, Ohio, USA

International Reference Centres for the Evaluation and Testing of New Insecticides

Toxicology Research Unit, Medical Research Council Laboratories, Carshalton, Surrey, United Kingdom

Tropical Pesticides Research Unit, Porton Down, Salisbury, Wilts., United Kingdom

Department of Entomology, College of Liberal Arts and Sciences, University of Illinois, Urbana, Ill., USA

Entomological Research Division, United States Department of Agriculture, Agricultural Research Service, Gainesville, Fla., USA

Technical Development Laboratories, Center for Disease Control, Savannah, Ga., USA

Mission entomologique, Centre Muraz, Bobo Dioulasso, Upper Volta

International Reference Centre for Maintenance and Distribution of Standardized Strains of the Aedes Complex

Department of Biology, University of Notre Dame, Ind., USA

International Reference Centre for Maintenance and Distribution of Standardized Strains of Anopheles

Ross Institute of Tropical Hygiene, London, United Kingdom

International Reference Centre for Maintenance and Distribution of Standardized Strains of the Culex pipiens Complex

Institute of Genetics, Johannes Gutenberg University, Mainz, Federal Republic of Germany

International Reference Centre for Maintenance and Distribution of Standardized Strains of Musca domestica

Institute of Zoology, University of Pavia, Italy

Regional Reference Centres for the Biology and Distribution of Ticks

Institute of Parasitology, Prague, Czechoslovakia

United States Naval Medical Research Unit No. 3, Cairo, Egypt

Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Department of Zoology, University of Maryland, College Park, Md., USA

COLLABORATING LABORATORIES

Collaborating Laboratory for the Study of Insect Viruses

* Station de Recherches Cytopathologiques, Faculté des Sciences, University of Montpellier, France

Collaborating Laboratory for Parasites and Pathogens of Mosquitoes

* Gulf Coast Mosquito Research Laboratory, United States Department of Agriculture, Lake Charles, La, USA

Collaborating Laboratories for Work on Insecticide Resistance

* Danish Pest Infestation Laboratory, Lyngby, Denmark

* Laboratory for Research on Insecticides, Wageningen, Netherlands

* Department of Entomology, London School of Hygiene and Tropical Medicine, London, United Kingdom

* Department of Entomology, University of California, Riverside, Calif., USA

Collaborating Laboratory for Work on Pesticide Toxicology

* Department of Toxicology, Institute of Medical Research, Yugoslav Academy of Sciences and Arts, Zagreb, Yugoslavia

Venereal Infections and Treponematoses

REFERENCES CENTRES

International Reference Centre for Endemic Treponematoses

Institut Alfred-Fournier, Paris, France

International Reference Centre for Gonococci

Neisseria Department, Statens Seruminstitut, Copenhagen, Denmark

International Treponematoses Laboratory Centre

Johns Hopkins University, Baltimore, Md., USA

International Reference Centres for the Serology of Treponematoses

Treponematoses Research Laboratory, Statens Seruminstitut, Copenhagen, Denmark

Venereal Disease Research Laboratory, Center for Disease Control, Atlanta, Ga., USA

Regional Reference Centre for Venereal Diseases and Treponematoses

* Venereal Diseases Reference Laboratory, Institute of Clinical Pathology and Medical Research, New South Wales Department of Health, Lidcombe, Australia

Virus Diseases, General ¹

COLLABORATING INSTITUTIONS AND LABORATORIES

Virus Collaborating Laboratories

Virus Laboratories, Laboratory Center for Disease Control, Department of National Health and Welfare, Ottawa, Ont., Canada

¹ See also Arbovirus diseases, Enterovirus diseases, Influenza, Respiratory virus diseases other than influenza, and Smallpox.

Department of Virology, National Institute of Public Health, Budapest, Hungary

Department of Microbiology, University of the West Indies, Mona, Kingston, Jamaica

Department of Medical Microbiology, Faculty of Medicine, University of Ibadan, Nigeria

Stefan S. Nicolau Institute of Virology, Bucharest, Romania

Institute of Bacteriology, St Gall, Switzerland

Trinidad Regional Virus Laboratory, Port of Spain, Trinidad and Tobago

Gamaleja Institute of Epidemiology and Microbiology, Moscow, USSR

Standards Laboratory for Serological Reagents, Central Public Health Laboratory, London, United Kingdom

Virus Reference Laboratory, Central Public Health Laboratory, London, United Kingdom

Division of Bacteriology and Virus Research, Medical Research Council's National Institute for Medical Research, London, United Kingdom

Department of Virology, Andrija Štampar School of Public Health, University of Zagreb, Yugoslavia

Wastes Disposal

REFERENCE CENTRES

International Reference Centre for Wastes Disposal

Federal Institute for Water Resources and Water Pollution Control, Dübendorf, Zurich, Switzerland

Regional Reference Centre for Wastes Disposal

* Central Public Health Engineering Research Institute, Nagpur, India

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Institutions and Laboratories for Wastes Disposal

Institute of Sanitary Engineering, Faculty of Engineering, University of Buenos Aires, Argentina

Water Science Laboratories, Melbourne Water Science Institute Ltd, Carlton, Victoria, Australia

Institute for Water Supply, Sewage Purification and Water Pollution Control, Vienna Technical University, Austria

Centre belge d'Etude et de Documentation des Eaux, Liège, Belgium

Central Office for Wastes Disposal, Berlin

Department of Environmental Health, School of Public Health, University of São Paulo, Brazil

SURSAN Institute of Sanitary Engineering, Rio de Janeiro, Brazil

Institute of Hygiene Research, Ministry of Public Health, Sofia, Bulgaria

Water Research Institute, Bratislava, Czechoslovakia

Sanitary Engineering Department, Faculty of Engineering, University of Alexandria, Egypt

Institut de Recherches hydrologiques, Nancy, France

Centre d'Etudes et Recherches des Charbonnages de France, Paris, France

Institut national de Recherche chimique appliquée, Vert-le-Petit, Essonne, France

Faculty of Engineering, University of Science and Technology, Kumasi, Ghana

Research Institute for Water Resources Development, Budapest, Hungary

Institute of Public Health Research and School of Public Health, University of Teheran, Iran

Environmental Health Laboratory, Department of Medical Ecology, Hadassah Medical School, Jerusalem, Israel

Sanitary Engineering Laboratories, Israel Institute of Technology, Haifa, Israel

Institute of Sanitary Engineering, Milan Polytechnic, Milan, Italy

Centre for Study and Research in Sanitary Engineering, University of Naples, Italy

Japan Environmental Sanitation Centre, Kawasaki City, Japan

Department of Civil Engineering, Faculty of Engineering, University of Nairobi, Kenya

Faculty of Engineering and Architecture, and School of Public Health, American University of Beirut, Lebanon

Government Institute of Sewage Purification, Voorburg, Netherlands

Foundation for Waste Disposal, Amersfoort, Netherlands

Works Division, Auckland Regional Authority, Auckland, New Zealand

Faculty of Engineering, University of Lagos, Nigeria

Department of Civil Engineering, Ahmadu Bello University, Zaria, Nigeria

Norwegian Institute for Water Research, Royal Norwegian Council for Scientific and Industrial Research, Oslo, Norway

Department of Sanitary Engineering and Environmental Pollution, National Institute of Public Health, Oslo, Norway

Department of Sanitation, National University of Engineering, Lima, Peru

Pan American Centre for Sanitary Engineering and Environmental Sciences, Lima, Peru

National Institute for Water Research, Council for Scientific and Industrial Research, Pretoria, South Africa

* Battelle Geneva Research Centre, Geneva, Switzerland

Division of Environmental Engineering, Asian Institute of Technology, Bangkok, Thailand

Sanitary Engineering Laboratory, Middle East Technical University, Ankara, Turkey

Water Pollution Research Laboratory, Stevenage, Herts., United Kingdom

* American Public Works Association, Chicago, Ill., USA

Office of Solid Waste Management Programs, Environmental Protection Agency, Rockville, Md., USA

Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina, Chapel Hill, N.C., USA

National Environmental Research Center, Environmental Protection Agency, Cincinnati, Ohio, USA

Center for Research in Water Resources, Balcones Research Center, University of Texas, Austin, Tex., USA

Faculté polytechnique, National University of Zaire, Kinshasa, Zaire

Water Supply

REFERENCE CENTRE

International Reference Centre on Community Water Supply

Chemical and Bacteriological Department, Institute for Water Supply, The Hague, Netherlands

COLLABORATING INSTITUTIONS AND LABORATORIES

Collaborating Institutions for Community Water Supply

* Institut d'Hygiène et d'Epidémiologie, Ministère de la Santé publique, Brussels, Belgium

SURSAN Institute of Sanitary Engineering, Rio de Janeiro, Brazil

Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

Institute of Hygiene, Medical Faculty, University of Aarhus, Denmark

Sanitary Engineering Department, Faculty of Engineering, University of Alexandria, Egypt

Section d'Hydrologie, Office de la Recherche scientifique et technique outre-mer, Paris, France

Department of Civil Engineering, Faculty of Engineering, University of Science and Technology, Kumasi, Ghana

Victoria Jubilee Technical Institute, Matunga, Bombay, India

All-India Institute of Hygiene and Public Health, Calcutta, India

Central Public Health Engineering Research Institute, Nagpur, India

Institute of Hydro-Sciences and Water Resources Technology, University of Teheran, Iran

Environmental Health Laboratory, Hadassah Medical School, Jerusalem, Israel

Centre for Study and Research in Sanitary Engineering, University of Naples, Italy

Institute of Water Research, National Research Council, Rome, Italy

Department of Sanitary Engineering, Faculty of Engineering, University of Tokyo, Japan

Department of Civil Engineering, Faculty of Engineering, University of Nairobi, Kenya

Faculty of Engineering and Architecture, and School of Public Health, American University of Beirut, Lebanon

Institute for Control of Waterpipe Material, Rijswijk, Netherlands

Faculty of Engineering, University of Lagos, Nigeria

* Department of Sanitation, National University of Engineering, Lima, Peru

Faculty of Engineering and Architecture, University of Khartoum, Sudan

* Battelle Geneva Research Centre, Geneva, Switzerland

Division of Environmental Engineering, Asian Institute of Technology, Bangkok, Thailand

Sanitary Engineering Laboratory, Middle East Technical University, Ankara, Turkey

Water Research Association, Medmenham, Marlow, Bucks., United Kingdom

Department of Civil Engineering, University of Newcastle upon Tyne, United Kingdom

Department of Environmental Engineering, College of Engineering, University of Florida, Gainesville, Fla., USA

Division of Water Hygiene, Water Quality Office, Environmental Protection Agency, Rockville, Md., USA

National Sanitation Foundation, Ann Arbor, Mich., USA

Department of Environmental Sciences and Engineering, School of Public Health, University of North Carolina, Chapel Hill, N.C., USA

Department of Sanitary Engineering, Faculty of Engineering, Central University of Venezuela, Caracas, Venezuela

Annex 6

RESEARCH GRANTS AWARDED FOR TRAINING AND EXCHANGE IN 1972,
BY SUBJECT AND TYPE OF GRANT

Subject	Training grants	Grants for exchange of research workers	Total
Bacterial diseases (other than leprosy and tuberculosis) . .	1	2	3
Cancer	1	5	6
Cardiovascular diseases	5	4	9
Dental health	2	1	3
Drug dependence and alcoholism	2	—	2
Drug evaluation and monitoring	1	—	1
Education and training	1	1	2
Food additives	2	—	2
Human genetics	4	1	5
Human reproduction	28	13	41
Immunology	9	3	12
Malaria	1	2	3
Maternal and child health	—	1	1
Mental health	4	1	5
Noncommunicable diseases	1	—	1
Nutrition	2	2	4
Occupational health	—	2	2
Parasitic diseases	3	4	7
Pharmaceuticals	—	1	1
Radiation health	—	1	1
Research in epidemiology and communications science . .	—	1	1
Strengthening of health services	1	3	4
Tuberculosis	—	1	1
Vector biology and control	1	3	4
Venereal diseases and treponematoses	—	2	2
Veterinary public health	1	3	4
Virus diseases (other than smallpox)	3	4	7
TOTAL ¹	73	61	134

¹ In addition, one research grant was awarded, supported by the Swedish National Association against Heart and Chest Diseases; and a grant awarded in 1971 was extended for one year.

Annex 7

**FELLOWSHIPS AWARDED, BY SUBJECT OF STUDY AND BY REGION,
1 December 1971 – 30 November 1972**

Subject of Study	Region						Total
	Africa	The Americas	South-East Asia	Europe	Eastern Mediterranean	Western Pacific	
Health Organization and Services							
PUBLIC HEALTH ADMINISTRATION							
Public health administration	17	82	42	43	31	31	246
Hospital and medical care administration . . .	14	27	7	15	16	9	88
Construction of health institutions	—	20	5	1	1	1	28
Medical librarianship	—	19	—	3	1	—	23
Sub-total — Public Health Administration	31	148	54	62	49	41	385
ENVIRONMENTAL HEALTH							
Environmental sanitation	71	81	33	78	33	33	329
Food control	3	16	4	13	5	7	48
Sub-total — Environmental Health	74	97	37	91	38	40	377
NURSING							
Nursing and midwifery	104	23	46	16	45	25	259
Public health nursing	21	14	4	4	4	12	59
Medical social work	4	4	—	—	2	—	10
Sub-total — Nursing	129	41	50	20	51	37	328
MATERNAL AND CHILD HEALTH							
Maternal and child health	4	5	8	10	43	20	90
Paediatrics and obstetrics	15	22	14	10	24	5	90
Sub-total — Maternal and Child Health	19	27	22	20	67	25	180
OTHER HEALTH SERVICES							
Mental health	4	15	12	50	6	7	94
Health education	2	20	15	1	16	8	62
Occupational health	12	6	15	5	17	14	69
Nutrition	6	75	20	7	10	18	136
Health statistics	6	49	10	27	12	8	112
Dental health	13	5	12	17	5	35	87
Rehabilitation	17	18	7	24	30	16	112
Control of pharmaceutical and biological preparations	8	15	15	19	16	12	85
Sub-total — Other Health Services	68	203	106	150	112	118	757
TOTAL — HEALTH ORGANIZATION AND SERVICES	321	516	269	343	317	261	2 027
<i>Percentage</i>	47	65	53	60	44	54	54

Annex 7 (continued)

Subject of Study	Region						Total
	Africa	The Americas	South-East Asia	Europe	Eastern Mediterranean	Western Pacific	
Communicable Diseases							
Malaria	10	6	39	2	42	68	167
Venereal diseases and treponematoses	2	4	5	1	3	6	21
Tuberculosis	9	35	23	18	15	18	118
Other communicable diseases	11	63	41	6	19	18	158
Laboratory services	59	31	43	31	86	24	274
Chemotherapy, antibiotics	—	—	—	1	2	—	3
TOTAL — COMMUNICABLE DISEASES	91	139	151	59	167	134	741
<i>Percentage</i>	13	17	30	10	23	28	20
Clinical Medicine, Basic Medical Sciences and Medical and Allied Education							
CLINICAL MEDICINE							
Surgery and medicine	11	1	8	15	19	9	63
Anaesthesiology	8	6	5	13	20	16	68
Radiology	17	3	13	3	35	5	76
Haematology	—	2	4	5	2	5	18
Other medical and surgical specialties	13	7	11	81	34	12	158
Sub-total — Clinical Medicine	49	19	41	117	110	47	383
BASIC MEDICAL SCIENCES AND MEDICAL AND ALLIED EDUCATION							
Basic medical sciences	26	4	29	25	32	11	127
Medical and allied education	21	117	14	29	18	12	211
Undergraduate medical studies	172	—	1	—	77	15	265
Sub-total — Basic Medical Sciences and Medical and Allied Education	219	121	44	54	127	38	603
TOTAL — CLINICAL MEDICINE, BASIC MEDICAL SCIENCES AND MEDICAL AND ALLIED EDUCATION	268	140	85	171	237	85	986
<i>Percentage</i>	40	18	17	30	33	18	26
GRAND TOTAL	680	795	505	573	721	480	3 754

Annex 8

PUBLICATIONS ISSUED IN 1972¹

MONOGRAPH SERIES

- 59 *Fluorides and Human Health*, by P. Adler et al. (F, S)
 60 *Waste Stabilization Ponds*, by E. F. Gloyna (F)

PUBLIC HEALTH PAPERS

- 41 *Mental Health of Adolescents and Young Persons*, report on a Technical Conference, by A. R. May, J. H. Kahn & B. Cronholm (R)
 42 *The Prevention of Perinatal Morbidity and Mortality*, report on a Seminar (E, S)
 43 *Principles of Health Planning in the USSR*, by G. A. Popov (S)
 44 *Planning and Programming for Nursing Services* (S)
 45 *Mass Health Examinations* (F, S)
 46 *Approaches to National Health Planning*, by H. E. Hilleboe, A. Barkhuus & W. C. Thomas, Jr (E)
 47 *Aspects of Medical Education in Developing Countries*. Selected Papers presented at the Second WHO Conference on Medical Education in the Eastern Mediterranean Region (E)
 48 *Evaluation of Community Health Centres*, by Milton I. Roemer (E, S)

TECHNICAL REPORT SERIES

- 439 *National Environmental Health Programmes: Their Planning, Organization, and Administration*, report of a WHO Expert Committee (R)
 443 *Insecticide Resistance and Vector Control*, seventeenth report of the WHO Expert Committee on Insecticides (R)
 450 *Biological Research in Schizophrenia*, report of a WHO Scientific Group (R)
 453 *Joint FAO/WHO Expert Committee on Milk Hygiene*, third report (S)
 464 *Joint FAO/WHO Expert Committee on Brucellosis*, fifth report (S)
 474 *Pesticide Residues in Food*, report of the 1970 Joint FAO/WHO Meeting (S)
 476 *Family Planning in Health Services*, report of a WHO Expert Committee (S)
 477 *Joint FAO/WHO Expert Committee on Nutrition*, eighth report (S)
 478 *The Use of Cannabis*, report of a WHO Scientific Group (S)
 479 *WHO Expert Committee on Yellow Fever*, third report (S)

- 481 *The Development of Studies in Health Manpower*, report of a WHO Scientific Group (S)
 482 *Evaluation and Testing of Drugs for Mutagenicity: Principles and Problems*, report of a WHO Scientific Group (S)
 483 *Health Education in Health Aspects of Family Planning*, report of a WHO Study Group (S)
 484 *Solid Wastes Disposal and Control*, report of a WHO Expert Committee (S)
 485 *Human Development and Public Health*, report of a WHO Scientific Group (E, F, S)
 486 *WHO Expert Committee on Biological Standardization*, twenty-fourth report (E, F, S)
 487 *WHO Expert Committee on Specifications for Pharmaceutical Preparations*, twenty-fourth report (E, F, S)
 488 *Evaluation of Food Additives*, fifteenth report of the Joint FAO/WHO Expert Committee on Food Additives (E, F, S)
 489 *Implications of Individual and Small Group Learning Systems in Medical Education*, report of a WHO Study Group (E, F, S)
 490 *Techniques for the Collection and Reporting of Data on Community Water Supply*, report of a WHO Scientific Group (E, F, S)
 491 *The Planning and Organization of a Health Laboratory Service*, fifth report of the WHO Expert Committee on Health Laboratory Services (E, F, S)
 492 *The Medical Uses of Ionizing Radiation and Radioisotopes*, report of a Joint IAEA/WHO Expert Committee (E, F)
 493 *WHO Expert Committee on Smallpox Eradication*, second report (E, F, S)
 494 *The Etiology and Prevention of Dental Caries*, report of a WHO Scientific Group (E, F, S)
 495 *Opiates and their Alternates for Pain and Cough Relief*, report of a WHO Scientific Group (E, F, S)
 496 *Clinical Immunology*, report of a WHO Scientific Group (E, F, S)
 497 *Genetic Disorders: Prevention, Treatment, and Rehabilitation*, report of a WHO Scientific Group (E, F, S)
 498 *International Drug Monitoring: The Role of National Centres*, report of a WHO Meeting (E, F, S)
 499 *Organization of Local and Intermediate Health Administrations*, report of a WHO Expert Committee (E, F, S)
 500 *Oral Enteric Bacterial Vaccines*, report of a WHO Scientific Group (E, F, S)
 501 *Vector Ecology*, report of a WHO Scientific Group (E, F, S)
 502 *Pesticide Residues in Food*, report of the 1971 Joint FAO/WHO Meeting (E, F)

¹ The language of issue is denoted as follows: C = Chinese; E = English; F = French; P = Portuguese; R = Russian; S = Spanish; E-F = English and French; E/F, E/S = bilingual edition.

- 503 *Nutritional Anaemias*, report of a WHO Group of Experts (E, F, S)
- 504 *Inherited Blood Clotting Disorders*, report of a WHO Scientific Group (E, F)
- 505 *Evaluation of Certain Food Additives and the Contaminants Mercury, Lead, and Cadmium*, sixteenth report of the Joint FAO/WHO Expert Committee on Food Additives (E, F)
- 506 *Air Quality Criteria and Guides for Urban Air Pollutants*, report of a WHO Expert Committee (E, F)
- 507 *Psychogeriatrics*, report of a WHO Scientific Group (E, F, S)
- 508 *Education and Training for Family Planning in Health Services*, report of a WHO Study Group (E, F, S)
- 509 *Treatment of Haemoglobinopathies and Allied Disorders*, report of a WHO Scientific Group (E, F)
- 510 *Statistical Principles in Public Health Field Studies*, fifteenth report of the WHO Expert Committee on Health Statistics (E, F, S)
- 511 *Development of Environmental Health Criteria for Urban Planning*, report of a WHO Scientific Group (E, F, S)

OFFICIAL RECORDS SERIES

- 181 *Executive Board, Forty-fifth Session*
Part I — Resolutions, Annexes (R)
- 183 *Financial Report, 1 January-31 December 1969, and Report of the External Auditor* (R)
- 184 *Twenty-third World Health Assembly*
Part I — Resolutions and Decisions, Annexes (R)
- 185 *Twenty-third World Health Assembly*
Part II — Plenary Meetings: Verbatim Records. Committees: Summary Records and Reports (R)
- 186 *Executive Board, Forty-sixth Session* (R)
- 189 *Executive Board, Forty-seventh Session*
Part I — Resolutions, Annexes (R)
- 196 *Proposed Programme and Budget Estimates for 1973* (R)
- 197 *The Work of WHO, 1971*
Annual Report of the Director-General (E, F, R, S)
- 198 *Executive Board, Forty-ninth Session*
Part I — Resolutions, Annexes (E, F, S)
- 199 *Executive Board, Forty-ninth Session*
Part II — Report on the Proposed Programme and Budget Estimates for 1973 (E, F, S)
- 200 *Financial Report, 1 January-31 December 1971, and Report of the External Auditor* (E, F, S)
- 201 *Twenty-fifth World Health Assembly*
Part I — Resolutions and Decisions, Annexes (E, F, S)
- 202 *Twenty-fifth World Health Assembly*
Part II — Plenary Meetings: Verbatim Records. Committees: Summary Records and Reports (E, F, S)
- 203 *Executive Board, Fiftieth Session* (E, F, S)
- 204 *Proposed Programme and Budget Estimates for 1974* (E, F, S)

Basic Documents, twenty-second edition (R)

Basic Documents, twenty-third edition (E, F, S)

Handbook of Resolutions and Decisions, eleventh edition (R)

OTHER PUBLICATIONS

- ✓ *Guide to Sanitation in Natural Disasters*, by M. Assar (R)
- ✓ *Health Aspects of Chemical and Biological Weapons*, report of a WHO Group of Consultants (R)
- ✓ *Conquest of Deficiency Diseases. Achievements and Prospects*, by W. R. Aykroyd (R)
- ✓ *Mortality from Malignant Neoplasms, 1955-1965, Part I* (R)
- ✓ *International Standards for Drinking-Water*, third edition (F, S)
- ✓ *Vector Control in International Health* (E)
- ✓ *International Histological Classification of Tumours No. 5: Histological Typing of Odontogenic Tumours, Jaw Cysts, and Allied Lesions*, by J. J. Pindborg & I. R. H. Kramer in collaboration with H. Torloni (F, S)
- ✓ *International Histological Classification of Tumours No. 6: Histological Typing of Bone Tumours*, by F. Schajowicz, L. V. Ackerman, H. A. Sissons in collaboration with L. H. Sobin & H. Torloni (E, F, S)
- ✓ *International Histological Classification of Tumours No. 7: Histological Typing of Salivary Gland Tumours*, by A. C. Thackray & L. H. Sobin (E, F)
- ✓ *Biological Substances. International Standards, Reference Preparations, and Reference Reagents, 1972* (E, F, S)
- ✓ *Training of Research Workers in the Medical Sciences. Proceedings of a Round Table Conference organized by CIOMS with the assistance of WHO and UNESCO, Geneva 10-11 September 1970* (E)
- ✓ *Introduction to Ergonomics*, by W. T. Singleton (E)
- ✓ *Specifications for the Quality Control of Pharmaceutical Preparations. Second edition of the International Pharmacopoeia, Supplement 1971* (S)
- ✓ *World Directory of Venereal-Disease Treatment Centres at Ports*, third edition (E/F)
- ✓ *World Directory of Schools of Public Health, 1971* (E)
- ✓ *Ciliated Protozoa. An Illustrated Guide to the Species used as Biological Indicators in Freshwater Biology*, by Hartmut Bick (E)
- ✓ *Health Hazards of the Human Environment*, prepared by 100 specialists in 15 countries (E, F)
- Drug Therapy of Cancer*, by G. Brulé, S. J. Eckhardt, T. C. Hall & A. Winkler (E)
- ✓ *WHO Food Additives Series No. 1: Toxicological Evaluation of Some Enzymes, Modified Starches and Certain Other Substances* (E)
- ✓ *WHO Food Additives Series No. 2: Specifications for the Identity and Purity of Some Enzymes and Certain Other Substances* (E)
- ✓ *WHO Food Additives Series No. 3: A Review of the Technological Efficacy of Some Antioxidants and Synergists* (E, F)
- ✓ *World Health Organization Publications: Catalogue 1947-1971* (F, S)

PERIODICALS

World Health

Monthly (E, F, P, R, S)

WHO Chronicle

Volume 25, No. 6-12 (C)

Volume 25, No. 9-12 (R)

Volume 26, No. 1-12 (E, F, S)

Volume 26, No. 1-7 (R)

Volume 26, No. 1 (C)

Bulletin of the World Health Organization

- Volume 44, No. 1-6 (R)
 Volume 45, No. 1-5 (R)
 Volume 45, No. 3-6 (E-F)
 Volume 46, No. 1-6 (E-F)
 Volume 47, No. 1-2 (E-F)

Supplement to Vol. 47 of the Bulletin

- Penicillin in the Treatment of Syphilis: the Experience of Three Decades*, by O. Idsøe, T. Guthe & R. R. Willcox (E)

International Digest of Health Legislation

- Volume 22, No. 4 (E, F)
 Volume 23, No. 1-3 (E, F)

World Health Statistics Report

- Volume 24, No. 11-12 (E/F)
 Volume 25, No. 1-11 (E/F)

World Health Statistics Annual

- 1968 — Volume III (E/F)
 1969 — Volume I (E/F)
 1969 — Volume II (E/F)

TRANSLATED WHO PUBLICATIONS ISSUED BY OTHER PUBLISHERS IN 1972¹

<i>Monograph Series</i>	<i>Language</i>	<i>Technical Report Series (continued)</i>	<i>Language</i>
<i>Child Care and the Growth of Love</i> (Based on Monograph Series No. 2: <i>Maternal Care and Mental Health</i> , by J. Bowlby), abridged and edited by Margery Fry	Dutch	432 <i>Research in Health Education</i> , report of a WHO Scientific Group	Japanese
49 <i>Operation and Control of Water Treatment Processes</i> , by C. R. Cox	Turkish	469 <i>Cerebrovascular Diseases: Prevention, Treatment and Rehabilitation</i> , report of a WHO Meeting	Japanese
<i>Public Health Papers</i>		472 <i>Statistical Indicators for the Planning and Evaluation of Public Health Programmes</i> , fourteenth report of the WHO Expert Committee on Health Statistics	Japanese
2 <i>Epidemiological Methods in the Study of Mental Disorders</i> , by D. D. Reid	Polish	481 <i>The Development of Studies in Health Manpower</i> , report of a WHO Scientific Group	Japanese
16 <i>The Scope of Epidemiology in Psychiatry</i> , by T.-Y. Lin & C. C. Standley	Polish		
30 <i>Noise. An Occupational Hazard and Public Nuisance</i> , by A. Bell	Japanese	<i>Other publications</i>	
<i>Technical Report Series</i>		<i>Protection of the Public in the Event of Radiation Accidents</i> . Proceedings of a Seminar jointly sponsored by the Food and Agriculture Organization of the United Nations, the International Atomic Energy Agency, and the World Health Organization	Serbo-Croat
367 <i>Treatment and Disposal of Wastes</i> , report of a WHO Scientific Group	Japanese	<i>Health Aspects of Chemical and Biological Weapons</i> , report of a WHO Group of Consultants	Finnish
389 <i>Morbidity Statistics</i> , twelfth report of the WHO Expert Committee on Health Statistics	Japanese	<i>International Medical Guide for Ships</i>	Portuguese
392 <i>Organization of Services for the Mentally Retarded</i> , fifteenth report of the WHO Expert Committee on Mental Health	Polish	<i>Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death</i> , eighth revision, Volume I	Portuguese
403 <i>Principles for the Clinical Evaluation of Drugs</i> , report of a WHO Scientific Group	Japanese	<i>Medical Research. Priorities and Responsibilities</i> . Proceedings of a Round Table Conference organized by CIOMS with the Assistance of WHO and UNESCO	Polish
406 <i>Research into Environmental Pollution</i> , report of five WHO Scientific Groups	Japanese		
410 <i>Urban Air Pollution, with particular reference to Motor Vehicles</i> , report of a WHO Expert Committee	Japanese		

PUBLICATIONS ISSUED BY THE PAN AMERICAN HEALTH ORGANIZATION IN 1972

SCIENTIFIC PUBLICATIONS SERIES

- 185 *Perinatal Factors Affecting Human Development*, second printing (E)
 185 *Factores perinatales que afectan el desarrollo humano* (S)

- 227 *Hechos que revelan progreso en salud 1971*, second printing (S)
 233 *Hacia la conquista de la salud—Obra de solidaridad entre los pueblos* (Selección de trabajos del Dr Fred L. Soper) (S)
 234 *National Health Systems* (E, S)
 235 *II International Symposium on Health Aspects of the International Movement of Animals* (E)
 236 *IV Inter-American Meeting on Foot-and-Mouth Disease and Zoonoses Control* (E, S)

¹ Publications translated and issued by publishers to whom translation rights had been granted by WHO. The Organization does not accept responsibility for these translations or undertake their distribution.

- 237 *The National Food and Nutrition Survey of Barbados* (E)
- 238 *Symposium on Vector Control and the Recrudescence of Vector-Borne Disease* (E)
- 239 *Symposium on Systems Analyses Applied to Health Services* (E)
- 240 *Guidelines for Food Fortification in Latin America and the Caribbean Area—Report of a Technical Group Meeting* (E, S)
- 241 *Manual de Nomenclatura e Codificação de Tumores* (P)
- 242 *Comité de Expertos de la OPS/OMS en la Enseñanza de Enfermería Medicoquirúrgica* (S)
- 243 *Workshop Symposium on Venezuelan Encephalitis Virus* (E)
- 244 *Contaminación ambiental—Discusiones Técnicas celebradas durante la XX Reunión del Consejo Directivo de la OPS* (S)
- 245 *Quinto Seminario sobre Diagnóstico, Clasificación y Estadística Psiquiátricos* (S)
- 246 *Clasificación Internacional de Enfermedades, octava revisión, Vols. I y II* (S)
- 247 *Reported Cases of Notifiable Diseases in the Americas, 1969* (E, S)
- 248 *Manual of Norms and Procedures for Cervical Cancer Control* (E, S)
- 249 *La hidatidosis—Educación para la salud, Guía para maestros No. 2* (S)
- 250 *El valor incomparable de la leche materna* (S)
- 251 *Proceedings of the Seminar on Malnutrition in Early Life and Subsequent Mental Development* (E)
- 252 *El control de las enfermedades transmisibles en el hombre, 11a edición* (S)
- 253 *International Conference on Tetanus Toxoid* (E)
- 254 *Proceedings of the First Pan American Symposium on Paracoccidioidomycoses* (E)
- 255 *La educación médica en América Latina* (S)

MISCELLANEOUS PUBLICATIONS

- 82 *Un buen comienzo—Programa autodidáctico suplementario de conducción de automóviles* (S)
- 83 *Primeros auxilios* (S)

OFFICIAL DOCUMENTS SERIES

- 111 *Final Report, PAHO Directing Council, XX Meeting; WHO Regional Committee, XXIII Meeting* (E/S)
- 112 *Basic Documents of the Pan American Health Organization, tenth edition* (E, S)
- 113 *Financial Report of the Director and Report of the External Auditor, 1971* (E, S)
- 114 *Proposed Program and Budget Estimates—Pan American Health Organization, 1973; World Health Organization, Region of the Americas, 1974; Pan American Health Organization, Provisional Draft, 1974* (E, S)
- 115 *PAHO Directing Council, XX Meeting; WHO Regional Committee, XXIII Meeting—Précis Minutes and Annexes* (E, S)
- 116 *Annual Report of the Director of the Pan American Sanitary Bureau, Regional Office of the World Health Organization, 1971* (E, S)
- 117 *Executive Committee of the Pan American Health Organization, 67th and 68th Meetings—Final Reports and Précis Minutes* (E, S)

OTHER PUBLICATIONS

- Catálogo de Publicaciones Especiales* (S)
- PAHO Fellowships Program for the Development of Human Resources* (E, P)
- Mens Sana* (S)
- Segundo Seminario sobre Programación de Inversiones en el Sector Salud* (S)
- Requisitos mínimos para la organización y el funcionamiento de la biblioteca de una escuela de medicina* (S)

PUBLICATIONS OF THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER IN 1972

Annual Report, 1971 (E, F)

Oncogenesis and Herpesviruses. Edited by P. M. Biggs, G. de-Thé & L. N. Payne (IARC Scientific Publications No. 2) (E)

N-Nitroso Compounds: Analysis and Formation. Edited by P. Bogovski, R. Preussman & E. A. Walker (IARC Scientific Publications No. 3) (E)

IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man. Vol 1. (E)

WHO LIBRARY STATISTICS, 1972

Acquisitions		Borrowed from other libraries	3 046
Periodicals received	3 190	Periodicals circulated to WHO secretariat	86 658
by subscription	853	Photocopying (number of exposures)	187 106
by exchange with WHO publications	1 425	Items consulted in reading rooms	45 625
by gift	912		
Annual reports received	2 094	Medical literature supply	
Books and pamphlets ordered	946	Orders placed for:	
Books and pamphlets received	4 023	Headquarters secretariat (number)	723
Volumes bound	1 384	(items)	1 798
		Regional Offices (number)	2 532
Calalogue		(items)	14 369
Titles catalogued	2 706	Duplicates distributed to Regional Offices and to other libraries	1 897
Documents indexed	6 836		
Index cards filed	78 036		
		WHO MEDLARS Centre (operational as from 1 March 1972)	
Loans		Retrospective bibliographies	175
Lent to WHO secretariat	11 693	Current awareness bibliographies	6 332
Lent to other libraries	6 290		

NONGOVERNMENTAL ORGANIZATIONS IN OFFICIAL RELATIONS WITH WHO
at 31 December 1972

Biometric Society	International Commission on Radiological Protection
Christian Medical Commission	International Committee of Catholic Nurses
Council for International Organizations of Medical Sciences	International Committee on Laboratory Animals
Inter-American Association of Sanitary Engineering	International Committee of the Red Cross
International Academy of Legal Medicine and of Social Medicine	International Confederation of Midwives
International Air Transport Association	International Council on Alcohol and Addictions
International Association for Accident and Traffic Medicine	International Council on Jewish Social and Welfare Services
International Association of Agricultural Medicine	International Council of Nurses
International Association for Child Psychiatry and Allied Professions	International Council of Scientific Unions
International Association of Logopedics and Phoniatrics	International Council on Social Welfare
International Association of Medical Laboratory Technologists	International Council of Societies of Pathology
International Association of Microbiological Societies	International Dental Federation
International Association for Prevention of Blindness	International Diabetes Federation
International Association on Water Pollution Research	International Epidemiological Association
International Astronautical Federation	International Ergonomics Association
International Brain Research Organization	International Federation of Fertility Societies
International Commission on Radiation Units and Measurements	International Federation of Gynecology and Obstetrics
	International Federation for Housing and Planning
	International Federation for Information Processing

International Federation for Medical and Biological Engineering	International Union for Health Education
International Federation of Medical Student Associations	International Union of Immunological Societies
International Federation of Multiple Sclerosis Societies	International Union of Local Authorities
International Federation of Ophthalmological Societies	International Union of Nutritional Sciences
International Federation of Pharmaceutical Manufacturers Associations	International Union of Pharmacology
International Federation of Physical Medicine	International Union of Pure and Applied Chemistry
International Federation of Sports Medicine	International Union of School and University Health and Medicine
International Federation of Surgical Colleges	International Union against Tuberculosis
International Hospital Federation	International Union against the Venereal Diseases and the Treponematoses
International Hydatidological Association	International Water Supply Association
International League of Dermatological Societies	Joint Commission on International Aspects of Mental Retardation
International League against Epilepsy	League of Red Cross Societies
International League against Rheumatism	Medical Women's International Association
International Leprosy Association	Permanent Commission and International Association on Occupational Health
International Organization for Standardization	Transplantation Society
International Organization against Trachoma	World Confederation for Physical Therapy
International Paediatric Association	World Federation of the Deaf
International Pharmaceutical Federation	World Federation of Hemophilia
International Planned Parenthood Federation	World Federation for Mental Health
International Society of Biometeorology	World Federation of Neurology
International Society of Blood Transfusion	World Federation of Neurosurgical Societies
International Society for Burn Injuries	World Federation of Occupational Therapists
International Society of Cardiology	World Federation of Parasitologists
International Society of Hematology	World Federation of Public Health Associations
International Society of Orthopaedic Surgery and Traumatology	World Federation of United Nations Associations
International Society of Radiographers and Radiological Technicians	World Medical Association
International Society of Radiology	World Psychiatric Association
International Society for Rehabilitation of the Disabled	World Veterans Federation
International Solid Wastes and Public Cleansing Association	World Veterinary Association
International Union of Architects	
International Union against Cancer	
International Union for Child Welfare	
International Union for Conservation of Nature and Natural Resources	

INTERGOVERNMENTAL ORGANIZATIONS WHICH HAVE ENTERED INTO FORMAL AGREEMENTS WITH WHO APPROVED BY THE WORLD HEALTH ASSEMBLY

International Committee of Military Medicine and Pharmacy	Organization of African Unity
International Office of Epizootics	World Intellectual Property Organization
League of Arab States	

Annex 11

REGULAR BUDGET FOR 1972

<i>Appropriation section</i>	<i>Purpose of appropriation</i>	<i>Amounts approved</i> ¹ US \$	<i>Supplementary estimates</i> ² US \$	<i>Transfers: ³ increase (decrease)</i> US \$	<i>Revised appropriations</i> US \$
PART I. ORGANIZATIONAL MEETINGS					
1.	World Health Assembly	523 394	30 800	(3 700)	550 494
2.	Executive Board and its committees	267 410	15 700		283 110
3.	Regional committees	139 200	—		139 200
	Total — Part I	930 004	46 500	(3 700)	972 804
PART II. OPERATING PROGRAMME					
4.	Communicable diseases	16 713 894	405 807	(353 900)	16 765 801
5.	Environmental health	5 907 152	655 451	(170 500)	6 392 103
6.	Public health services	18 445 672	522 711	179 700	19 148 083
7.	Health protection and promotion	5 454 562	158 670	(83 500)	5 529 732
8.	Education and training	8 666 350	322 730	367 200	9 356 280
9.	Other activities	12 750 412	1 232 568	15 000	13 997 980
10.	Regional offices	7 148 965	263 578	46 000	7 458 543
	Total — Part II	75 087 007	3 561 515	—	78 648 522
PART III. ADMINISTRATIVE SERVICES					
11.	Administrative services	5 451 089	388 775	—	5 839 864
	Total — Part III	5 451 089	388 775	—	5 839 864
PART IV. OTHER PURPOSES					
12.	Headquarters building: Repayment of loans	554 900	14 500	3 700	573 100
	Total — Part IV	554 900	14 500	3 700	573 100
	EFFECTIVE WORKING BUDGET (PARTS I, II, III AND IV)	82 023 000	4 011 290	—	86 034 290

¹ See resolutions WHA24.42, EB49.R5 and EB50.R13.² Approved by the Twenty-fifth World Health Assembly in resolution WHA25.5.³ Subject to such additional transfers as may be necessary in conjunction with the closure and audit of the final accounts for 1972.

Annex 12

NUMBERS AND DISTRIBUTION OF THE STAFF ¹
at 30 November 1971 and 30 November 1972

Distribution	Staff as at 30 November 1971					Staff as at 30 November 1972				
	Total	Regular Budget	Voluntary Funds	Other sources	IARC	Total	Regular Budget	Voluntary Funds	Other sources	IARC
Headquarters ²										
Internationally recruited	489					494				
Locally recruited	701					713				
	1 190	1 103	7	80	—	1 207	1 126	17	64	—
Regional offices										
<i>Africa</i>										
Internationally recruited	57					58				
Locally recruited	243					254				
	300	295	—	5	—	312	312	—	—	—
<i>The Americas</i>										
Internationally recruited	37					35				
Locally recruited	53					57				
	90	85	—	5	—	92	92	—	—	—
<i>South-East Asia</i>										
Internationally recruited	37					37				
Locally recruited	148					156				
	185	185	—	—	—	193	189	—	4	—
<i>Europe</i>										
Internationally recruited	50					48				
Locally recruited	116					124				
	166	159	—	7	—	172	171	—	1	—
<i>Eastern Mediterranean</i>										
Internationally recruited	39					39				
Locally recruited	112					116				
	151	149	—	2	—	155	153	—	2	—
<i>Western Pacific</i>										
Internationally recruited	38					36				
Locally recruited	95					100				
	133	131	—	2	—	136	134	—	2	—

¹ Excluding short-term consultants.² Including liaison offices.

Annex 12 (continued)

Distribution	Staff as at 30 November 1971					Staff as at 30 November 1972				
	Total	Regular Budget	Voluntary Funds	Other sources	IARC	Total	Regular Budget	Voluntary Funds	Other sources	IARC
WHO representatives' and zone offices										
Internationally recruited	42					44				
Locally recruited	107					119				
	149	149	—	—	—	163	163	—	—	—
Field staff in countries										
Internationally recruited	929					935				
Locally recruited	81					89				
	1 010	711	1	298 ^a	—	1 024	732	3	289	—
International Agency for Research on Cancer										
Internationally recruited	36					33				
Locally recruited	74					83				
	110	—	—	—	110	116	—	—	—	116
Interregional and other activities										
Internationally recruited	81					106				
Locally recruited	25					29				
	106	86	7	13	—	135	104	11	20	—
	3 590	3 053	15	412	110	3 705	3 176	31	382	116
Staff on loan to WHO, or on leave without pay	51					52				
Staff seconded to other organizations . .	2					1				
WHO GRAND TOTAL	3 643					3 758				
PAHO GRAND TOTAL	1 050					1 141				

^a Including 8 agents in Zaire.

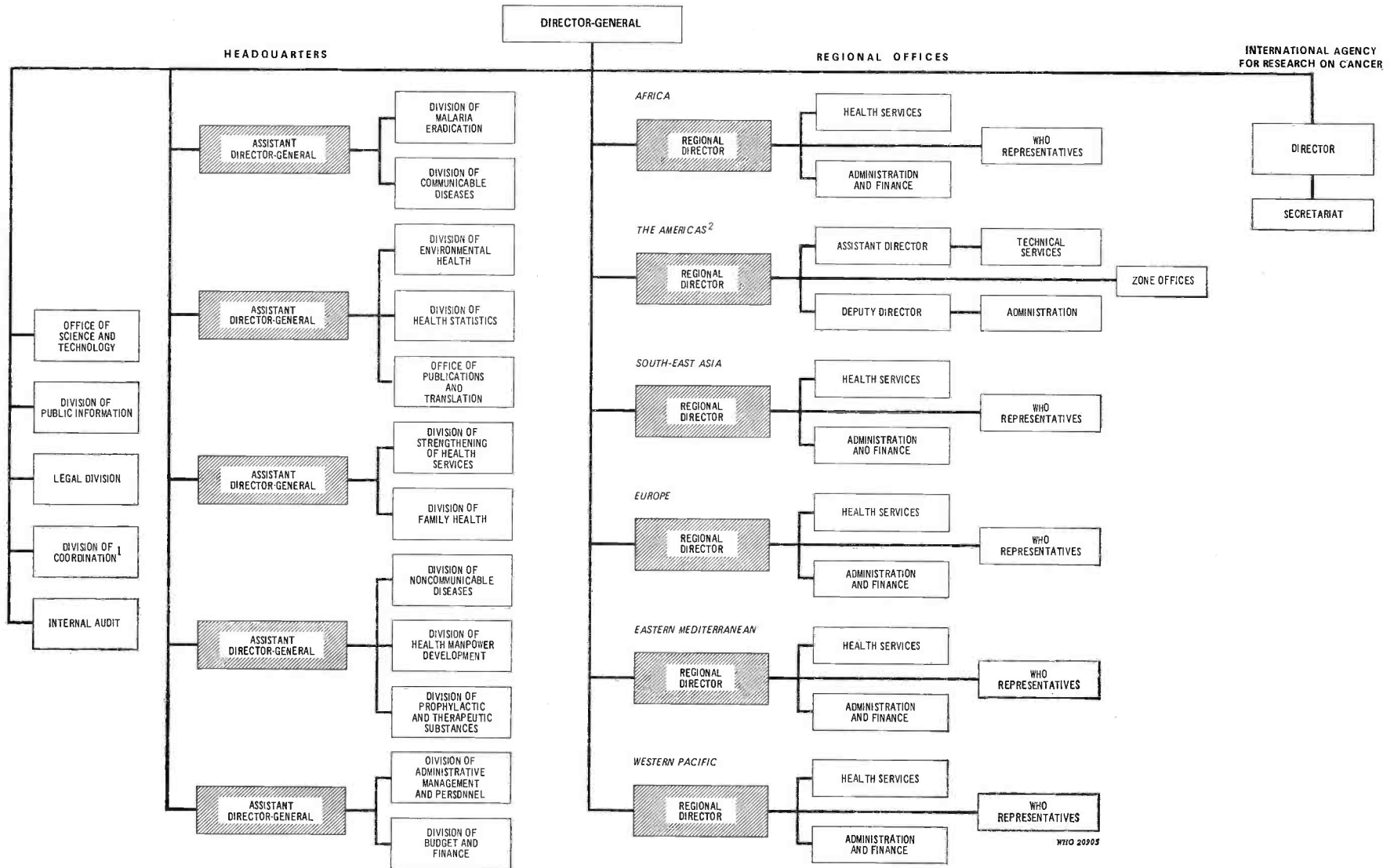
Annex 13

Country	WHO	PAHO	Total
Afghanistan	3	—	3
Argentina	19	29	48
Australia	32	—	32
Austria	15	—	15
Bangladesh	2	—	2
Barbados	2	—	2
Belgium	39	2	41
Bolivia	5	11	16
Brazil	16	25	41
Bulgaria	5	—	5
Burma	5	—	5
Burundi	1	—	1
Cameroon	4	—	4
Canada	63	5	68
Chile	20	40	60
China	19	4	23
Colombia	20	28	48
Congo	2	—	2
Costa Rica	7	14	21
Cuba	2	2	4
Cyprus	4	—	4
Czechoslovakia	17	1	18
Dahomey	8	—	8
Democratic Yemen	1	—	1
Denmark	23	1	24
Dominican Republic	—	2	2
Ecuador	10	11	21
Egypt	39	—	39
El Salvador	1	8	9
Ethiopia	2	—	2
Finland	9	—	9
France	138	1	139
Gambia	2	—	2
Germany, Federal Republic of	53	2	55
Ghana	7	—	7
Greece	13	—	13
Guatemala	4	34	38
Guyana	1	1	2
Haiti	17	—	17
Honduras	1	5	6
Hungary	10	—	10
India	63	3	66
Indonesia	6	—	6
Iran	13	—	13
Iraq	7	—	7
Ireland	16	2	18
Israel	11	2	13
Italy	47	—	47
Jamaica	7	—	7
Japan	19	—	19
Jordan	12	—	12
Lebanon	21	—	21
Lesotho	1	—	1
Liberia	3	—	3
Luxembourg	1	—	1
Madagascar	1	—	1
Malaysia	3	—	3
Mali	1	—	1
Malta	3	—	3
Mauritius	9	—	9

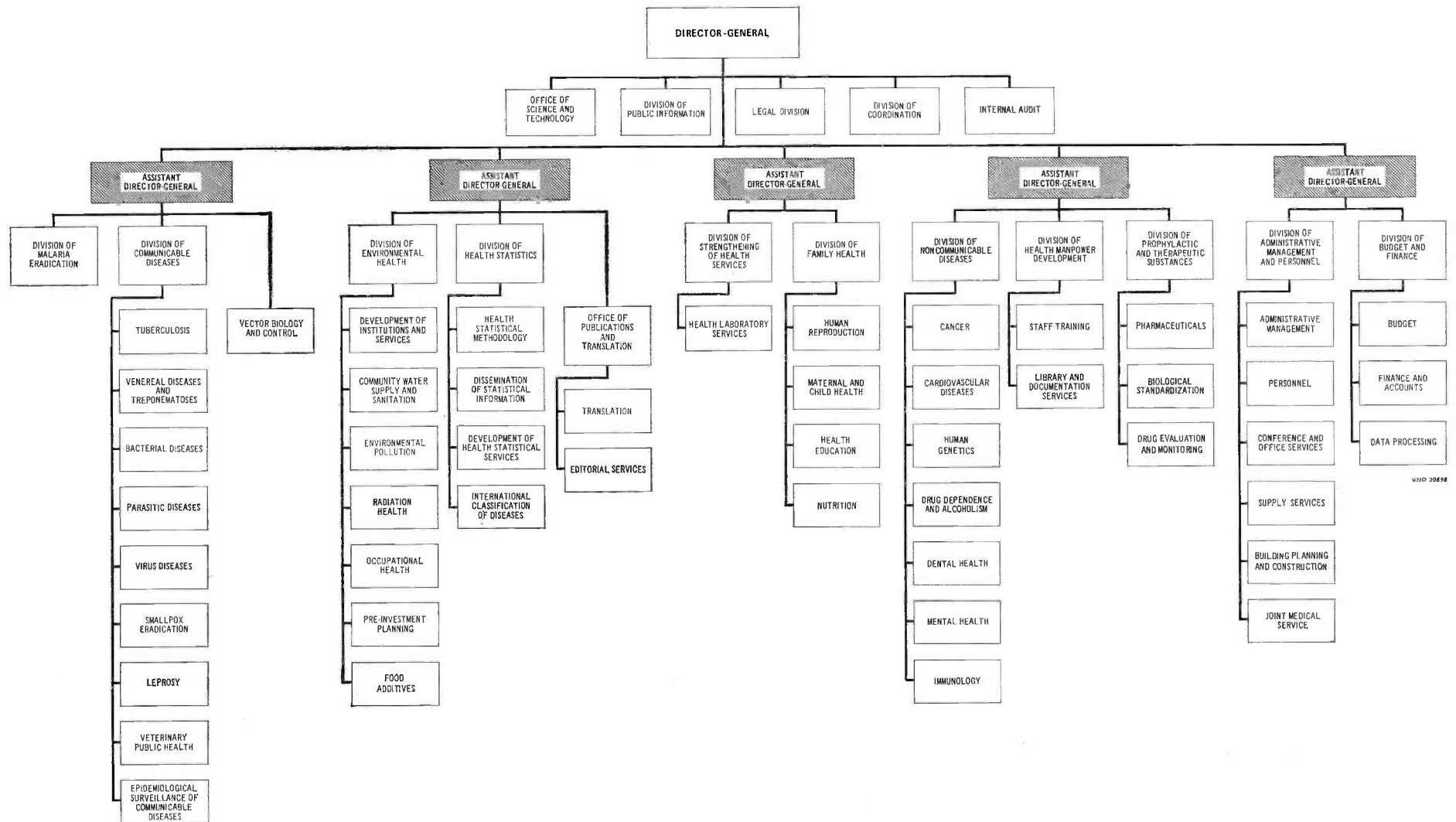
Country	WHO	PAHO	Total
Mexico	9	18	27
Morocco	2	—	2
Nepal	5	—	5
Netherlands	31	1	32
New Zealand	16	—	16
Nicaragua	1	2	3
Nigeria	11	—	11
Norway	9	1	10
Pakistan	21	1	22
Panama	3	2	5
Paraguay	4	2	6
Peru	16	22	38
Philippines	23	—	23
Poland	25	—	25
Portugal	5	3	8
Republic of Korea	14	—	14
Romania	13	—	13
Senegal	3	—	3
Sierra Leone	3	—	3
Singapore	2	—	2
Somalia	1	—	1
South Africa	1	—	1
Spain	24	8	32
Sri Lanka	15	—	15
Sudan	9	—	9
Sweden	27	1	28
Switzerland	50	1	51
Syrian Arab Republic	13	—	13
Thailand	6	—	6
Togo	6	—	6
Trinidad and Tobago	6	2	8
Tunisia	3	—	3
Turkey	4	—	4
Uganda	1	—	1
Union of Soviet Socialist Republics	44	—	44
United Kingdom of Great Britain and Northern Ireland	172	14	186
United Republic of Tanzania	4	—	4
United States of America	200	84	284
Uruguay	6	12	18
Venezuela	4	8	12
Viet-Nam	5	—	5
Yemen	1	—	1
Yugoslavia	37	—	37
Zambia	1	—	1
Stateless	2	—	2
TOTAL	1 743	415	2 158
International Agency for Research on Cancer	34	—	34
Geographically excepted posts	129	—	129
Staff locally recruited	1 851	726	2 577
Staff on secondment to other organizations	1	—	1
GRAND TOTAL	3 758	1 141	4 899

STRUCTURE OF THE WORLD HEALTH ORGANIZATION AT 31 DECEMBER 1972

WHO SECRETARIAT AS A WHOLE



WHO HEADQUARTERS SECRETARIAT





THE WORK OF WHO, 1972

ANNUAL REPORT OF THE DIRECTOR-GENERAL

TO THE

WORLD HEALTH ASSEMBLY AND TO THE UNITED NATIONS

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1973

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